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A
H I S T O R Y
OF THE PRACTICE OF
TREPPANNING THE SKULL,
A N D
THE AFTER-TREATMENT;
W I T H
O B S E R V A T I O N S
U P O N
A NEW METHOD OF CURE,
ILLUSTRATED BY A CASE.

BY ROBERT MYNORS, SURGEON.

RES QUÆ JUVAMENTUM PRÆBET, OPORTET UT ITER-
RETUR MULTOTIES, ET INCITETUR.

Berengarius Carpenfis ex Galeno.

B I R M I N G H A M .
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(M,DCC,LXXXV.)

E R R A T A,

PAGE 45, line 4, for *acid* read *acrid*.

———— 75, ——— 1, — *semicircular* r. *circular*.

———— 80, ——— 18, — *circumstance* r. *circumstances*.

———— 127, ——— 4, after *where* add *to*.

R54832

INTRODUCTION.

ON the 3d of June 1784, a Narrative of the Case of a Fractured Skull, and observations thereon, were sent to Dr. S. F. Simmons, requesting their insertion in the number of the London Medical Journal then in the press. In the course of a few days, the authors received this answer from him : “it comes too late for the number now in the press, but it shall certainly have a place in the next.”

The Dr. however has since thought proper to publish *an abridgment only* of the communication, and without mentioning such intention to the authors. As the form, in which it appears in the

journal, renders them liable to the charge of inaccuracy and inconsistency, and not having been able to obtain redress from the Dr.; in justice therefore to themselves, and in expectation of general utility, they now publish the case and observations at large.

The present alterations of some parts of the Narrative, &c. sent last year to Dr. Simmons, are made with a view to elucidate such passages, as seemed to have been somewhat obscurely expressed. These alterations will easily appear to the Dr. on comparing the present publication with the M. S. which still remains in his possession.

Had Dr. Simmons continued to conduct the journal alluded to, upon the same *liberal principles*, which were promised to the readers of the first volume, in the preface of the *Editors*;

errors; * and had he thence been induced to correct the style of the M. S. sent him, and to arrange its materials in a manner, which he might think becoming the *Editor* of that work; had he not suppressed any facts, omitted, or in-feebled any arguments; and had he not perverted the sense in the former part of one paragraph, thence misapplying the reasoning in the latter part: the authors acknowledge, that they should have been greatly obliged to him, as such a step would have effectually superseded the present publication.

* " Their numerous readers may be assured, that as they engaged in this undertaking on the most liberal principles, so they will continue to prosecute it with the utmost candour, and with unremitting attention." See preface to the 1st volume of the London Medical Journal.

In consequence of this declaration, the credulous authors entrusted Dr. Simmons with their M.S. to publish in the Medical Journal.

Thus circumstanced, and finding all remonstrances and reasonable proposals for a proper accommodation of this matter ineffectual; they informed him of their determination to publish the case and observations in some other manner.

In about a fortnight after, he unexpectedly sent me an *epistle*, informing me of his *surprize* at finding Mr. Wilmer of Coventry, as he was pleased to say, recommending the very same mode of treatment, as that practised by Mr. Jones and myself;* since which, he has communicated the same idea to the readers of his journal, by introducing into the

* The *good* Dr. in the letter alluded to, writes as follows:

“*Happening* this morning to be looking into the Cases and Remarks in Surgery published about five years ago, by Mr. Wilmer, an ingenious Surgeon at Coventry, I was not a little surprized at finding him in pages 46 and 47, recommending the very same mode of treatment as that practised by you and Mr. Jones.”

A copy of this identical passage, the reader may find at p. 83, &c. of the Historical Sketch, beginning at “The present method, &c.

subsequent

subsequent number of that work, the following paragraph.

“ In addition to the Case of fractured Scull, described in a former part of this volume (page 278), we think it right to observe, that the mode of treatment adopted in that case was first suggested by Mr. Wilmer, an ingenious Surgeon at Coventry, in his *Cases and Remarks in Surgery*, published in 1779. In that work he contends, that it is not absolutely necessary to remove any portion of the scalp, even when the scull is extensively fractured; and in proof of this, he observes, that in several cases of fractured scull; in which it was necessary to apply the trephine more than once, he has seen the cure accomplished, without removing any portion of the scalp. Mr. Wilmer adds, that the wounds were healed in half the time that must have been employed, if excision

had taken place; and that he has seen but one case, thus treated, where the exfoliation of the bone was necessary.—The case related by our correspondent merits attention, as it affords an additional proof of the safety and efficacy of the method of cure recommended by Mr. Wilmer.” See Lond. Med. Journal, vol. V, No. 4, p. 440.

Such has been the *liberal* treatment from Dr. S. F. Simmons to his correspondent!—“subtilius quam utilius nonnulli disputant”, says Peter Paaw! * and without making any further reply, I may safely leave the reader to form his own opinion; after requesting him only to compare the above paragraph with the following Historical Sketch, particularly with that part of it beginning at (r) p. 83 and ending p. 97, and with the Nar-

* Petri Paaw Comment. in Hippoc. de Capitis Vulneribus.

relative of the Case, &c. annexed ; as from thence the Doctor's errors and sophistry, I trust, will be clearly detected, and his insinuations against the originality of the authors method fully confuted. For notwithstanding my ingenious friend Mr. Wilmer has so laudably endeavoured to revive the ancient practice of preserving the flaps of the scalp, when denuding the cranium previous to the operation of the trepan ; yet he, like every other writer both ancient and modern, as far as my reading extends, did not attempt to unite them to the surface of the dura mater, exposed after the operation, by the first intention, but suffered that membrane, as well as the rest of the wound to undergo the process of suppuration, &c. and after granulations of new flesh had sprung up from the several parts, and were united with each other, then, and not till then, did he begin to cicatrize the wound.

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Had it *happened* that the *learned* Dr. S. F. Simmons from his *extensive reading* on this subject, had been aware of these circumstances, and had *it happened* at the same time that he had been possessed of only a moderate share of practical knowledge in the art of healing wounds; he would not then have *shrewdly insinuated* in the Medical Journal, that his correspondent had claimed a discovery of Mr. Wilmer's, nor would he have endeavoured *so candidly* to propagate *his opinion*, that the method of cure practised in the boy's case, on Sept. 12th, 1783, was first suggested by that gentleman.

And I must here beg leave to assure the reader, that I never received any hint respecting the practice alluded to from either men or books; but that it originated solely from the resources, which will be hereafter mentioned in
the

the observations ; and which were communicated to Dr. Simmons last June to have been published in the London Medical Journal.

In penning those few observations, which were sent to the Dr. I then studiously avoided saying any more than what I thought would be sufficient to excite the attention of surgeons to this important subject ; but from the interpretation which that *accurate discriminator* Dr. S. F. Simmons has been pleased to give of my practice, I am now obliged to depart from my first intention, and to make the following additions, which have necessarily enlarged the work to its present size.

Besides the ready opportunity, which the Historical Sketch will afford to my readers of comparing the former practices, with that which I now recommend,

mend, as I flatter myself that it will be found to have been executed with fidelity and attention, it may serve to shew by what very slow steps mankind approach towards perfection, and how much they are contented with copying and imitating their predecessors: for when with a glance, as it were, we can discriminate the whole that *has* been done, we are the better enabled to judge how much still remains *to be* done.

Birmingham Feb. 27th. 1785.

HISTORICAL SKETCH
OF THE PRACTICE OF
LAYING BARE THE SKULL,
PREVIOUS TO THE OPERATION OF
THE TREPAN, OR TREPHINE;
AND OF THE SUBSEQUENT TREATMENT
OF THE DURA MATER, &c.

(a) **H**IPPOCRATES gives no particular form for the incision of the scalp, previous to the operation of the terebra, unless, in the latter part of the eighteenth chapter in his book of wounds of the head, when speaking of round, and very hollow ulcers of that part, he observes, that we ought to

(a) Hippocratis Opera, edit. Charterii, lib. de Vuln. Cap. cap. 18, 20, &c. — He lived about 450 years before Christ.

dilate them longitudinally, so that the ulcers may be rendered long. When he treats of dilating a wound of the head, where the bone has been denuded, he directs the incision to be made in the superior part sufficiently large to ascertain whether the bone be injured, and to separate the flesh from the bone; further observing, that the section of the parts for the above purpose ought not to be made on the temples, nor about the temporal artery; for convulsions on the opposite side would be the consequence. When the incision is made, the wound is to be filled up with lint, which by the next day will dilate it sufficiently; after the lint is introduced, a cataplasm is to be applied, made of barley-meal mixed and boiled with vinegar till it becomes very glutinous. In cases where the injury of the bone seems to require perforation, we must have recourse to it within three days,

days, nor must we exceed that period if the case be undertaken in the summer. He directs in cases of simple or contused wounds of the scalp, that they be digested, cleansed, and exsiccated as soon as possible --- and says, the same treatment is proper for the dura mater; observing, that that membrane when denuded, should be cleansed and exsiccated as soon as possible; lest, if it be kept moist too long, it become spongy, and rise into a fungus, or putrefies.

(b) CELSUS remarks, that if the wound of the scalp be not sufficiently open, it must be enlarged till the injured part appear; in doing which, we must take care that none of the pericranium be left on the bone; for that, when lacerated by the scalprum or tere-

(b) Celsus de Medicina, Ed. Krause, p. 516, &c. --- He was cotemporary with our Saviour.

bræ, would excite violent fever with inflammation; therefore, it is better to remove it wholly from the bone. If there be a wound, it is necessary to dilate in the course of it; but if we are to make one, that form is generally most convenient, which, by two transverse lines, gives the figure of the letter X, that the scalp may be afterwards raised up from each angle. After the operation, he directs the dura mater to be sprinkled with sharp vinegar, that, if there be any hæmorrhage, it may be suppressed, or any coagulated blood remain within, it may be dissolved. His dressings to the dura mater are the same as he recommends at page 517, viz. some of his plaister composed expressly for the skull, softened with vinegar, and applied by itself; upon that, a little broader than the wound, a piece of linen besmeared with the same medicine, and over that unwashed wool dipt in vinegar; then he binds

binds up the wound, and places the patient in a warm room. He dresses once a day, or twice in the summer. If the dura mater should puff up by inflammation, tepid oil of roses should be poured upon it ; and if it rise above the edge of the bones, it should be restrained by an ointment composed of lentils or vine leaves powdered, and mixed with fresh butter or goose oil.

If the membrane should seem foul, equal parts of his plaister and honey mixed should be poured upon it, placing one or more pieces of lint for the sake of retaining it ; the whole to be covered with linen spread with plaister.—When the membrane is clean, a cerate of roses is to be added to the plaister to produce flesh. When things go on well, he observes that granulations spring up from the dura mater, and from the diploë of the cranium, filling up the va-

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cuity of the bone, and sometimes even to grow above the bone : but when that happens, it is to be sprinkled with squamæ æris, to suppress and restrain it, and to use such other dressings as will produce a cicatrix.

(c) HELIODORUS observes, that he does not use one method only of incising the soft parts, but adapts it to the form and nature of the fracture. For sometimes in a fissure, he says, a simple incision is proper ; but he mostly uses that form, which, by two transverse lines, gives the figure of the letter X. —After the perforation, (at p. 100) he gently wipes off what little blood may be left on the dura mater, with a probe armed with wool and dipt in oxy-crate ; then drops oil of roses on the membrane ; afterwards puts lint moist-

(c) Heliodorus de Fracturis ex Nicetana collectione per Cocchium. P. 91, &c.

tened with oil of roses under the separated parts, and longer doubled pieces dipt in the same oil between the lips of the wound; directing the doublings of the lint to be turned inward, and their ends outward, lest they touch the membrane, &c. When the dura mater and the rest of the wound are properly incased, he directs cicatrification to be performed by a soft ointment composed of cadmia and oil of roses.

(d) GALEN observes, that the affected bone must be denuded according as it is accustomed to be done, and at page 152 says, it is necessary to remove somewhat of the fracture, that we may be able to deterge and wash away the sanies from the dura mater: afterwards, when the first inflammation is over, he advises dry dressings to produce flesh and

(d) Galeni Method. medendi lib. 6to edit. Chart. P. 151, &c. — He lived nearly 200 years after Christ.

cicatrize the wound. In the latter part of the same chapter he asks, what is the principal intention of all our medicaments and care after the perforation of the bone : whether should the treatment consist of lenient and mitigant applications which are now mostly used, or of very drying medicaments ? The latter of which Meges Sidonius approves, and Eudemus, an old experienced practitioner, a citizen of ours, always used, viz. a plaister called Isis, to be applied immediately to the dura mater, and over that oxymel ; but I have never seen any other person use them, nor dare I. I can only testify for Eudemus, that more were cured by him, than by those who used lenients. I should have had opportunities of trying this method, if I had always resided in Asia ; but as I have mostly lived at Rome, I have followed the practice of that city, leaving the greatest part of operations of this kind

to

to the surgeons. He concludes in favour of the drying medicaments, from reasoning that the meatus auditorius, which not only communicates with the dura mater, but with the nerve sent to it from the brain, will bear very active medicaments; nor is it, therefore, to be wondered at, if the dura mater, which is naturally of a dry texture, will, when exposed, before it becomes much inflamed, bear very powerful applications.

(e) PAULUS ÆGINETA directs, after the hair is shaved off, to make two incisions at the wound, intersecting each other at right angles (as he says like the Greek letter \times) one of which should be in the direction of the wound; then to separate the four angles in the middle, that the bone which is to be perforated be totally denuded. At p. 593

(e) Pauli Æginetæ de re Medica. Lib. 6, p. 592. Ed. Stephani. He lived about 640 years A. C.

after the perforation, he directs the dura mater to be covered with linen, dipt in oil of roses, according to the size of the wound, and over that to lay a small lock of wool, dipt also in oil of roses; then a doubled piece of linen, dipt in wine and oil, or oil of roses, over the whole wound; taking care that the dressings do not press on the membrane. He then uses a broad bandage, not applied tight, but only so as to retain the dressings.

(f) RHAZES recommends in a fracture with depression, the speedy extraction of the fractured bone, cautioning the operator against injuring the dura mater in the operation, and advises it to be done before symptoms of danger appear.

(f) Rhazes de re medica, per Gerard Toletanum, &c. Lib. 7. Cap. 26, P. 180.—He lived about 930 A. C.

(g) HALY ABBAS advises, after the head is shaved, to make two incisions intersecting each other at right angles in form of a cross, and says that one of the incisions should be in the course of the wound made by the blow; he then directs to separate the four angles till the whole of the bone, which you want to perforate, be laid bare. After the perforation of the bone by the terebellum, he applies a small piece of linen, moistened with oil of roses beneath the perforation of the bone; afterwards another fold of linen, dipt in wine and oil of roses over the whole wound, &c.

(b) ALBUCASIS orders the head of the patient to be shaved, and the flesh stripped from the bone all round,

(g) Haly Filius Abbas. Lib. 9, Practice Cap. 84, p. 287.—He lived to about 1110 years A. C.

(b) Albucasis de Chirurgia curâ Channing. Tom. 3, p. 533.—He lived to about 1130 A. C.

according to the figure of the wound, in as gentle a manner as possible. After the perforation of the bone (p. 539) he applies to the dura mater a piece of linen, the size of the wound, dipt in wine and oil of roses; over that he places a double or threefold piece of linen, with all possible care, that the membrane be not compressed, &c.

(i) AVICENNA recommends a mode of incising the scalp exactly similar to that of Haly Abbas. At p. 191, after the operation he directs to take a piece of linen the size of the perforation, dipt in oil of roses, and to cover up the wound in the bone; then to anoint the rest of the wound with oil of roses, and to apply a double or threefold piece of linen lightly, lest it press on the dura mater, covering the whole

(i) Avicennæ Opera, Tom. 2. Lib. 4. Fen. 5. Tract. 3. P. 190. He lived to about 1040 years A. C. Some say to 1145; others to 1165.

with a broad retentive bandage. After the third day he dresses afresh with medicines to absterge, incarn, and assuage inflammation, and applies to the dura mater a powder composed of drying ingredients, called, *medicina capitis*, till granulations are produced.

(*k*) BRUNUS says, if the wound of the head be large, so that the fracture be manifest, we must endeavour to extract the fragments of bone in such manner as the opening will admit of; but if it be small, and the fracture hidden, we must then make two incisions in the form of a cross, &c. He inveighs against some practitioners who had been used to cut off the corners of the flaps, in the following words, “*Et ex stolidis quidem medicis sunt, qui amputant angulos vulneris. &c.*” Af-

(*k*) *Chirurg. Magna*, Lib. 1. P. 90, &c.——He lived about 1230 A. C.

ter the perforation, his first dressing is fine old linen dipt in the white of an egg; over that a doubled piece of linen moistened with the same, so as to fill up the wound; then a thin linen compress the size of the wound, with a slight bandage.

(1) ROLANDUS recommends the crucial incision of the scalp, and to separate it from the cranium with the ruginæ. After the perforation of the bone, he orders a piece of fine old linen to be applied between the cranium and dura mater; then another piece of old linen, or silk which he prefers, to be placed so as to prevent matter from falling on the dura mater; sometimes, for this purpose, he uses well-washed sponge, and then fills up the external wound with linen dipt in the white of egg, &c.

(1) Rolandus Lib. 1, P. 147. He lived to about 1240 A. C.

LAN-

(*m*) LANFRANCUS tells us, that some practitioners cut the scalp in the form of a cross, thus $+$, then raise up the four quarters, and separate the pericranium, and afterwards use the trepan; but he did not use the crucial form, preferring triangular incisions made thus ∇ , by means of which he made only one flap of scalp in denuding the bone. After the perforation, he directs a piece of fine linen, moistened with one part of the honey of roses, and two parts of the oil of roses, to be inserted carefully between the cranium and the dura mater, filling up the wound of the bone with the same. To the wound of the scalp, pledgits dipt in the yolk of egg and oil of roses, &c.

(*n*) GUIDO, after relating seven documents, which he thinks necessary

(*m*) Lanfranci Chirug. Magn. Tract 2, p. 176, et Chirurg. Parva. p. 161. — He lived about the year 1270.

(*n*) Guidonis de Cauliaco Chir. Magna a Joberto. pag. 167. — He lived about 1360.

to be attended to, adds the eighth, in which he recommends the operation to be performed as soon as possible in cases of great compression, and in which the dura mater is punctured, to avoid imposthumations, &c. He observes, that he agrees with Avicenna respecting the performance of the operation, and quotes him through the whole process; but adds, after describing the crucial incision (aut ad figuram cifræ 7, ut dicit Lanfrancus). After the operation, he says, the wound is to be cured, as he himself has taught at page 165, by first applying a small piece of fine linen, or a soft findon macerated in honey and oil of roses, in such a manner that a little of it, may, by the end of a probe, be inserted between the bone and the dura mater, to preserve the membrane from being injured by its motion against the bone: over that soft cotton macerated, at least at the first dressing, in the same mixture:

mixture; and over these, as well as on the bone itself, a piece of linen imbued also, to prevent the matter from falling on the dura mater. In the wound of the flesh he puts dry pieces of cotton, or a piece of sponge, to imbibe the discharge, and then the emplastrum capitale perforated, so as not to confine the matter; lastly, he applies stupes pressed out of warm wine, and one not moistened, with a light retentive bandage. When the wound is well cleansed, he removes the first sinton, and orders the pulvis capitalis to be applied, and continued to generate flesh; and lastly, he cicatrizes and consolidates it with the powder.

(o) BERTAPALIA approves of a triangular or quadrangular incision of the scalp, with a removal of the peri-

(o) Bertapalia de Fractura Cranii, p. 261. He flourished in 1417.

cranium. When a portion of the cranium is removed, he applies the yolk of egg, mixed with warm oil of roses ;—fills up the wound with doffils dipt in the same medicine, and anoints the adjacent parts with warm oil of roses : he sometimes moistens the doffils with warm oil of roses alone, and fills up the wound with them till digestion appears ; over which, having the part first shaved, he applies his digestive ointment called *unguentum de resina pini*, and over the whole a betony-plaister. After digestion is compleated, he dresses with honey of roses alone ; discontinuing the use of oil of roses, esteeming the dura mater and cranium to be of a dry nature.

(p) THEODORICUS employs the crucial incision, and directs the four an-

(p) Theodoricus, Lib. 2, p. 115. He lived in the year 1494.

gles of the scalp to be well dissected from the bone. He, in the words of Brunus, condemns the practice of cutting off the flaps. To the dura mater he applies fine old linen, and fills up the rest of the wound with linen compresses dipt in the white of an egg; over that a linen stupe dipt in warm wine, or in the white of egg, &c.

(*q*) JOHANNES DE VIGO says, if the wound be not large, it is best to enlarge it immediately by a crucial or triangular incision, 'till the fractured or suspected bone be uncovered. The pericranium is then to be entirely separated from the bone by the nails, lest it be torn by the instruments in perforating the bone; for such accidents (as Celsus says) would produce great pain, inflammation, and fever. Having compleat-

(*q*) Johan. de Vigo *Practica*, Lib. 3, de *Vuin.* p. 255.
He flourished to 1517.

ed the operation, he recommends a small lincdon, or piece of fine linen, moistened with warm oil of roses, to be applied with a silver probe, between the dura mater and the bone; over that another, moistened with the same oil, so as to cover the denuded bone. He then directs the wound to be filled up with a pledgit of digestive, composed of yolks of eggs, oil of roses, and a little saffron, and over that, a large pledgit of digestive, &c.

(*r*) BERENGARIUS CARPENSIS speaks of the incision of the scalp to this effect;—let a triangular or quadrangular incision be made as soon as possible, in the most depending part. After the removal of the bone (p. 314), he advises the blood and sanies to be cleansed from the dura mater, and proceeds to fill up

(*r*) Jacob. Bereng. Carpenfis de fract. Cran. Cap. 42, p. 302. — He first published de Fractura Cranii in 1535.
the

the wound with proper doffils dipt in the honey or oil of roses, either alone, or mixed occasionally: he also directs a sindon, dipt in whatever medicine shall be thought best, to be inserted between the bone and dura mater, 'till granulations of flesh fill up the space. He observes (at p. 304), that oil of roses and other sedatives must be applied in the beginning only, and to be continued not longer than four, seven, or at farthest ten days; he then uses exsiccants. And (at p. 306), he wishes young surgeons to know, that, when the dura mater is uncovered, it always incarns; and so much flesh sometimes grows upon it, that some have believed it suffered apostems; for the cure of which they used plaisters made of fenugreek, linseed, with hen's fat, and the like; but the soft flesh increased more from that treatment, and sometimes rose into a fungus, which produced an increased

discharge of sanies, and from thence bad accidents.

(s) **MARIANUS SANCTUS** recommends the triangular or crucial incision, and to remove the pericranium from the bone. After perforation (p. 174), he immediately drops on the dura mater as much strained honey of roses as will cover it, lest it be injured by the air; and directs the whole of the perforation to be filled up with aqua vitæ; to which he adds as much of a powder, composed of aloës, sarcocolla, myrrh, frankincense, dragon's blood, and saffron, as will lie upon the membrane about the thickness of a spatula: he then stops up the foramen with a piece of sponge, dresses the rest of the wound with aqua vitæ, &c. covering the whole with unguent. basilic, &c.

(s) *Marianus Sanctus de Capit. læsione*, p. 173, per *Andream Gesner*. — Lived about 1539.

FAL-

(*t*) FALLOPIUS says, we ought to make a simple incision, beginning from the inferior part and carrying it upward; and if that be not sufficient, he prefers the triangular form, which will produce dilatation as much as is necessary. The pericranium is to be cut and deraded with the nails, for the same reasons which Celsus gives. At page 653 he recommends lenients to the dura mater, observing that he has used them with happy success. At p. 654 he advises warm oil of roses to be applied to the dura mater upon lint, &c.

(*u*) VESALIUS teaches the same method of incising the scalp, and separating the pericranium from the bone, as Fallopius has done; advances similar arguments in favour of the latter, and from

(*r*) Gabr. Fallopii Opera omnia in Lib. Hipp de Vuln. Cap. 38, p. 646. — He died in 1563.

(*u*) Andr. Vesalij Op. omn. Chirurg. Magn. Lib. II, Cap. 11, p. 947. — Died in 1564.

the same authority. At p. 950 he urges the necessity of perforating the cranium according to Galen, viz. in order to de-terge and wash away the fanies from the dura mater; and after the inflammatory stage is over, he recommends such applications as will produce flesh and cicatrize the wound; observing farther, that the dura mater is of itself dry, and before it is seized with inflammation will bear strong medicaments.

(v) VIDUS VIDIUS remarks, that Hippocrates gives no form for making the incision of the scalp. He recommends it to be done after the figure of the letter X, one incision to be made in the course of the wound as usual; the scalp and pericranium are then to be separated, and raised from the bone; for, says he, how can the bone appear un-

(v) Vidi Vidii Chirurg. P. 92. — Died in 1567.

less the pericranium be separated from it. At p. 100, speaking of the mode of treating the dura mater after the operation, he quotes the practice of Hippocrates, Celsus, Galen, and Paulus, and seems to recommend exsiccants when the membrane is not inflamed, otherwise he has recourse to lenients, afterwards detergents and exsiccants.

(w) PAREY observes, if the wound in the scalp be not sufficiently large, then the musculous skin, with the pericranium lying under it, must be cut with an incision knife, in a triangular or quadrangular figure of a proper size; always shunning, as much as possible, the futures and temples. At page 266 he says, they must be so plucked from the skull that none thereof remain upon the bone; for if the pericranium be rent or

(w) Parey's works, by Johnson, book 10, p. 265.—Parey published 1579.

torn with the trepan, it would cause vehement pain, with inflammation; you must begin to pull it back at the corners of the lines crossing each other at right angles with a chissel; a figure of which instrument he subjoins. At p. 287 his application to the dura mater, is a linen tent, steeped in syrup of roses or worm-wood, and a little aqua vitæ, with intention to press down the dura mater; lest it be hurt by the edges of the skull, &c. If there be a wound of the dura mater, he first applies an agglutinating powder..

(x) BOTALLUS says, the form of incision of the scalp is two fold, either triangular, or tetragonal, but he prefers the latter. He directs the incision to be made quite down to the bone, and the pericranium to be removed with a scalprum; observing, that it may like-

(x) Leonardi Botalli Op. omn. de Vuln. Sclopetorum, P. 661, — He flourished about 1582.

wise be done with the nails. After the operation, at p. 744, he directs to dress the dura mater with a findon, the edge of it to be inserted beneath that of the divided bone; he dips the findon, previous to its application, in honey of roses, mixed with three times its quantity of oil of roses. But if the dura mater be wounded, he orders Venice turpentine to be applied alone; and afterwards with the addition of honey of roses, when digestion has taken place.

(y) GUILLEMEAU directs an incision to be made thus \times , or in the form of a Borghondiane cross, which in its middle presents four corners, and sometimes that in the form of the letter T, which last makes but two corners; but if the wound be sufficiently large for the application of the trepan, &c. he directs the

(y) Jaques Guillemeau's *Chirurgerye*, p. 11. — He published in 1594.

pericranium to be totally separated from the skull, and the wound to be dilated with lint only, leaving it till the next day; when if any parcel of skin, or lip of the wound be found to hinder the use of the trepan, he clips it off with scissars.

(2) VIDUS VIDIUS JUN^R. observes with Hippocrates, (and most of the other antient writers) that when the head is to be incised, the incision is not to be made upon the temples, for fear of bringing on bad symptoms, which misfortunes have frequently befallen those unskilful surgeons, who not only dilated in every wound of the head, even where it was not necessary, but generally more than was necessary; for they made two transverse lines in all cases, according to the figure of the letter X, which is not always proper,

(2) Vidus Vidius, junr. de Curatione membratim, Lib. 6, p. 289. He published in 1594.

as we ought to trace the direction of the fracture. He then quotes Hippocrates in favour of simply dilating the wound, and removing the pericranium, as we have already observed. At p. 293, after the operation, he directs warm oil of roses to be applied to the dura mater, or blood, still warm, taken from a vein in the wing of a dove or pidgeon; and says, the white of an egg, mixed with the same oil, may be properly applied to the scalp, &c.

(a) ANDREAS A CRUCE relates, that if the size of the wound be not sufficient to expose the fractured bone, it must be enlarged, and if the form of it be convenient for that purpose, it will be sufficient; but, if we are to make a wound, he recommends it to be done in the form of the letter X;

(a) *Johannis Andreæ a Cruce Chirurg. P. 37, ed. venet. 1596.*

then the scalp to be raised, together with the pericranium, from the skull. He further remarks, that the incision, commonly called the crucial, should be made only in case of a large fracture, or great depression of the bone; otherwise the triangular, or that in the form of the letters ∇ or \sqcap may be used. And, if on account of the size of the wound, and straight direction of the fracture, it can be dilated, and its lips somewhat separated, there will be no need of incisions; the pericranium must then be separated immediately from the bone, either with the finger nail or a blunt-edged instrument; the lips, by these means, will be equally distant from each other, so that the fracture may appear, and the operation be conveniently performed. At p. 51, his application to the dura mater after the operation, is warm oil of roses, &c.

(b) QUERCETANUS speaking of injuries done to the head, without a wound of the scalp, observes, that a wound should be cut with a knife, decussatim, sufficiently large for the necessary operations. To the dura mater (p. 95) he applies a red silken sinderon, dipt in a mixture of two parts of mel. rosarum, and one part of ol. luteorum ovorum made warm.

(c) PECCETTIUS agrees with Celsus, Paulus and others, that the incision should be made in the form of an X, or +, in such manner that the wound make one of the lines. The pericranium is to be separated from the skull, that the injuries of the bone may be seen the better, and lest it be torn in operating, which would produce pain, inflammation, fever and death. At

(b) Jos. Quercetani Sclopetarius p. 90. Ed. Lugdun. 1600.

(c) Franc. Peccettii Chirurg. p. 326. Ed. Flor. 1616.

p. 337 to the dura mater, he applies suppurants till digestion is compleated; then detergents and exsiccants, to be varied according to the constitution of the patient, the season of the year, and the state of the wound.

(d) GLANDORPIUS says, if the wound be not sufficiently large, let it be dilated with a knife in the form of a cross, the point of which knife he directs to be defended with wax, and let the pericranium be perfectly separated from the cranium. He directs (p. 24) anodyne demulcent applications to the dura mater.

(e) FABRICIUS AB AQUAPENDENTE informing us of the situation and connection of the pericranium,

(d) Matthiæ Glandorpii Opera omnia p. 23. Edit. Londini 1729. He first published in 1619.

(e) Hieron Fabr. ab Aquapendente Opera omnia p. 188. Edit. Lugd. 1723. He died in 1619.

says:

says, in perforating the cranium; we cut both the skin and pericranium, and totally denude the bone of its pericranium, otherwise if the terebra was applied on it, inflammation, fever, and other symptoms would follow; for as the pericranium arises from the dura mater, and passes through the sutures to the outside of the skull, if the pericranium be hurt, the affection would be easily communicated to the dura mater, by reason of their connection. At p. 203, if the skull be fractured, and the scalp not wounded, he recommends the crucial incision, with a free removal of the pericranium. He observes, that the dura mater is easily affected by the air: and at p. 204 says, when the cranium is perforated, the edges of the wound of the bone are to be smoothed with the lenticular. At p. 206, he applies to the dura mater tepid oil of roses, either alone, or mixed with rosin, &c.; then

a round piece of linen the size of the wound, imbued with the same oil, upon the foramen, lest the lint to be afterwards applied fall into it, and so either press the dura mater, or dangerously insinuate itself between it and the cranium; he then applies more lint dipt in oil of roses, and afterwards covers the whole with Hippocrates's plaister, made of barley meal and vinegar, boiled together till they become glutinous.

(*f*) FIENUS says, if the wound be not sufficiently large, it must be dilated. In case of fracture without a wound, the crucial incision of the scalp was mostly used, and the pericranium cut down to the bone; but sometimes the triangular incision was employed, viz. that the sutures and some blood vessels might be avoided, then the pericranium was re-

(*f*) Thomæ Fieni Chirurgia, Tract. 1, p. 21. Edit. Lond. 1733. — He died in 1631.

removed from the bone, by an obtuse instrument, or the back of the knife, so that the angles of the scalp might be raised. At p. 22 he says, there is another method of denuding the cranium, by which the skin is not cut, but burnt, either by the actual or potential cautery. The actual cautery used for this purpose, he informs us, is a cylindrical sharp-edged instrument, in the form of a canula; when it is used, it is to be placed upon the scalp, to burn it down to the bone; which done, that part of the scalp included within the cautery is to be torn away from the bone, which must there be fairly denuded. This method of denuding the cranium, he says, has many advantages; 1st, it leaves no angles of the skin to obstruct trepanning, but only makes a round foramen: 2dly, it averts all danger of hæmorrhage from the division of any artery; for the cautery in its operation closes the arteries,

so that it is very convenient when there is danger of hæmorrhage: 3dly, its chief advantage is, when there is a necessity of trepanning immediately, as when the operation has been too long delayed, or there may be danger in procrastination; for when this method is used, you may proceed to the operation of the trepan immediately, which cannot be done when the scalp is cut, for then it requires a delay of one night at least, and often two, or more, if the recent wound should bleed again: the 4th advantage is, that from the operation of burning, and the skull being made hot, the fibres of the dura mater adhering to the skull within will perish, and thus may the piece of bone taken out by the terebra be separated and removed without violence. After the operation (p. 27), he dresses the dura mater either with oil of roses alone, or mixed with honey of roses, or the yolk of an egg: as a lenient application
to

to its lacerated fibres. When the pain is relieved, he applies a small findon, dipt in honey of roses, over the dura mater, as well as on the denuded bone. At p. 28, he remarks, that the foramen in the skull is closed up by new flesh, and that no new bone supplies the place of that which may have been taken away, but granulations shoot up, partly from the dura mater, partly from the skull, and partly from the lips of the wound; and when all are joined together, the foramen is filled up with flesh, which in time becomes callous, and often defends the brain as well as if new bone had been generated.

(g) BANNESTER directs an incision to be made in the scalp, in form of the letter X, and to uncover the bone. After the perforation of the skull (p. 206)

(g) Bannester's Works, p. 205. Published in 1633.

he dresses the dura mater with honey of roses on a red filken findon, in the usual manner, with digestive to the lips of the wound, &c.

(b) ARCÆUS recommends the triangular incision of the scalp, and removal of the pericranium. After the operation he applies mel. rosar. to the dura mater, together with his liniment, &c.

(i) JOHN WOODALL observes, that “ the incision of the scalp is either
 “ to be made directly crosse, or in the
 “ forme of this Romane T, and when
 “ the cutis is divided, together with
 “ membrana carnosâ, or fleshie mem-
 “ brane, the pericranium, or pannicle

(b) Franc. Arcæus de reſta: curand vuln. ratione, p. 33. Edit. Amſtelodam. 1658. He is ſuppoſed to have lived about 1560.

(i) Woodall's Military and Domeſtique Surgery, p. 3 and 4. London: printed in 1639.

“ covering the skull, is also to be ta-
“ ken away, that the fractured part be
“ bare,” &c. At p. 92 his dressing to
the dura mater, after the operation, is
“ the noble liniment of Arcæus, ne-
“ ver sufficiently commended, and, be-
“ ing somewhat hotter than the partie,
“ would willingly beare it; anoint the
“ wound therewith in each place, with a
“ little soft lint on a probe’s end, leaving
“ the said lint therein, and with pledg-
“ ents of lint drie, fill up the ori-
“ fice, &c. In want of Arcæus liniment,
“ you may take ol. rofar. and mel. rofar.
“ which are not much inferior to the for-
“ mer being warm applied,” &c.

(k) PETER LOWE advises, “ an
“ incision of the flesh to the pan in
“ forme of St. George’s crose, then to
“ separate the crane from the pericrane
“ putting lint, or caddie, to dilate the

(k) Peter Lowe’s Surgery p. 313. Lond. 1654.

“wound”. At p. 319, “If the dura:
 “mater be inflamed or in any wise al-
 “tered, as often happeneth, and is most
 “dangerous, for which we give glysters,
 “and draw blood, and use fomentations
 “in the place of anodynes and reper-
 “cussives. If there be alteration, make
 “a medicine of honey of roses, syrup of
 “wormwood, aqua-vitæ, with a little
 “aloes and myrrh, some add to it a little
 “white wine. If there be great putre-
 “faction, put thereto a little ægyptiac,
 “if there be neither inflammation nor
 “alteration, it shall suffice only a little
 “aqua-vitæ with honey of roses, so con-
 “tinuing till the membranes be mun-
 “dified, applying always the medi-
 “cines hot, and cure it afterwards as
 “other wounds.”

(1) FELIX WURTZ advises “to
 “lance the skin cross-way to the skull,

(1) Felix Wurtz's *Surgerie*, translated by Fox, pages 70
 and 71. London. 1656.

“ in the breadth of half a crown, and
“ put back the four pieces that the
“ skull be naked,” &c. At p. 64, describing the manner of treating the dura mater, he says, “ my advice is
“ not to use any powders, waters, oyles,
“ salves, which some do make and
“ apply them to the skull, and the dura
“ mater : for I marvelled much that in
“ this particular, nature was not better
“ regarded, whereas neither the skull
“ nor the brain can endure any thing.”
In the same page he says, “ first make
“ ready fine, clean, white lint, and lay
“ it into the wound gently, not roughly
“ as they usually do, nor to thrust it
“ in, nor deeper than the skull is,
“ and that the ends of such lints do
“ hang over the wound, that they
“ may with more ease be taken out
“ again ; upon these lints others may be
“ laid of the same stuffe ; which with
“ the ointment must be made wet, but
“ not

“ not too much, that nothing drop
 “ from it on the pia mater, then apply
 “ the head-plaister upon,” &c. Formulæ of two head plaisters and of the ointment are given at pages 72 and 73.

(*m*) PETRUS DE MARCHETTIS informs us, that he made a crucial incision, in the cure of a fractured skull with contusion of the scalp. At p. 7, he describes his having applied to a wound of the brain, fine dry lint, and to the dura mater in an inflamed state, oil of roses, with a digestive to the lips of the wound, &c.

(*n*) JOBUS A MEEKREN relates a case where he used the crucial incision of the scalp, and dressed the dura mater with warm honey of roses and spirit of

(*m*) Petri de Marchettis Obs. med. chirurg. p. 24. Ed. Amstelodam. 1665.

(*n*) Jobi a Meekren Obs. med. chirurg. p. 3. Ed. Amstelodam. 1682.

wine, upon fine linen four times doubled. At p. 19, he mentions having used a triangular incision in a fracture of the skull with a wound of the temporal muscle. He dressed the dura mater as before.

(o) HILDANUS in a case of fracture of the skull with a small wound of the scalp, tells us, that he practised the crucial incision of the integuments, and denudation of the cranium. After the perforation, he applied to the dura mater a filken findon moistened with mel. rofar. and a little ol. rofar. filling up the wound with a digestive, over this a plaister of basilicon, &c. When the pain and inflammation were abated, he applied mel. rofar. with a few drops of spir. vin. to the dura mater, and a mundificative ointment to the rest of the wound, &c.

(o) Gul. Fabric Hildani Opera Cent. 4. Obs. IV. p. 289.
Edit. Francofurt. 1682.

(*p*) MUNNICKS says, having shaved the head, the skin, together with the pericranium, is to be incised, unless it be divided by a wound, in the form of a cross or triangle. The pericranium is then to be separated from the subjacent bone, either with the nails or the separatorium. At p. 276, he applies to the dura mater, a red silken or white linen findon, moistened with mel. rosar. and a third or fourth part of spir. vini. over this a dossil of dry lint; dry lint to the bone, and a digestive ointment to the lips of the wound. And over all a convenient bandage.

(*q*) SCULTETUS recommends the crucial incision, or the triangular, where the futures or temporal muscles forbid the former; he directs the lips of the

(*p*) *Johannis Munnicks Chirurgia* p. 275. Edit. Ultraject. 1689.

(*q*) *Sculteti Armament Chirurg.* p. 108. Ed Lugd. 1691.

wound, as well as the pericranium, to be separated with the thumb and fore-finger nails from the substance of the bone. At p. 112, we observe, his application to the dura mater to be a red filken, or linen sindon, moistened with warm oil of roses, dossils of dry lint over it, as well as to the cranium, and a digestive to the lips of the wound, &c.

(*r*) MUYS observes, that some surgeons, before they apply the trepan, make choice of a crucial incision of the scalp, others a triangular, but his father almost always preferred a circular incision, and then he separated and plucked away that whole portion of scalp from the cranium. At p. 183 he recommends warm syrup of roses to be applied upon a sindon of linen to the dura mater, giving it the preference to

(*r*) *Johannis Muys Praxis Medico-chirurgic. Rationalis*
p. 182. Edit. Amst. 1695.

oil of roses, which, he says, Scultetus applied, or to vinegar, which Celsus used; observing further; that syrup of roses is less acid than honey of roses.

(5) WISEMAN teaches that when “the symptoms do demonstrate that there is a fracture or fissure, you are then, without delay, to open the hairy scalp, according as the part will admit, angularly, or in the manner of a cross, or of the letter T, that the fracture may be discovered by the raising of it up with its pericranium. For, if you shall in doubtful fissures or fractures, make a round incision and take out the whole piece; then if there chance to be no fissure, you have made yourself a long work to little purpose: and if the fissure run under the hairy scalp further than you made your incision, you may then

(5) Wiseman's *Chirurgical Treatises*, pages 371, 372.
3d Edit. Lond. 1697.

be necessitated to cut it open that length; by which it will appear you have, through mistake, laid it open more than was necessary in one place, and too little in another, doing that which neither Hippocrates, nor any judicious surgeon, would ever allow. Whereas, if you had laid it open by a cross incision, you might, by only raising the scalp, have discovered the fissure or fracture: and if yet part of the fissure or fracture had lain undiscovered, you might have stretcht your incision to it: and in case, after all, there had been no fracture or fissure, which often happens, especially in contra fissues, then you might have laid the hairy scalp down again and easily cured it; which, by an incision of part of the scalp, you cannot do. As to what may be objected, that the raised-up lip might be troublesome to the surgeon in his work, and painful to the

the

the patient; there is no such thing: for if the incision be made the way proposed by the antients, and that the fracture or fissure be all in your view, you may order the lips of the wound as you please." At p. 373, he says, "In order to the perforation of the cranium, the bone must be cleared of its pericranium lest in setting on the terebra or modiolus (which are two several names for a trepan) you tear the membrane." After the operation he advises the use of lenients to the dura mater, observing in common cases after recent terebrations that resin by its emplastic quality mixed with ol. ros. perfects the concoction soon, and by its anodyne quality secures the part from inflammation, &c. At p. 377 he directs these medicaments to be applied to the membranes upon a sindon, and over that soft dossils of lint to fill up the void space in the bone, thereby to keep

keep the dura mater from rising above it, &c.

(*t*) PURMANNUS remarks thus, “ if the wound be large enough there is no need to make a cross cut, but only a small incision; if the wound be long, then only make a thwart cut, and extend it as you think convenient.” At p. 18. he directs to be applied to the dura mater a silken or linen findon moistened and warmed, but not too large, that nature may have room enough for the extrusion of the putrefied matter.

(*u*) DIONIS says, if the wound be not large enough for the application of the trepan, we must dilate it either in the shape of an X, a T, a V, or the

(*t*) Matthæi Gothofredi Purmanni Chirurg. curiosa translated Page 17, Chap. 5. Lond. 1706.

(*u*) Dionis's Chirurgical Operations, p. 274. Lond. 1710.

figure of 7, according to the situation of the wound in the head. He directs the pericranium to be separated as gently as possible. At p. 287 to the dura mater he says should be first applied, a few drops of white balsam, then bindons moistened with a mixture composed of honey of roses, and the white balsam in the usual manner. When the perforation is filled up with linden stopples, he then dabs the bone with spirit of wine, and dresses the rest of the wound with a digestive ointment, &c.

(v) BELLOSTE says, “as for the operation of trepanning, which I have often performed, considering that nothing extraordinary hath therein occurred I will pass it over in silence.” At p. 77, says he, “when the dura mater is uncovered, I propose a plate of lead very

thin and smooth, pierced into holes in several places, without any inequality, cut and fitted to the bigness of the opening; and to make it more exact, I sketch it out with the crown of the trepan that I have used, or am to use in this operation: Or its measure may be taken from the piece of the skull cut out by the trepan. On each side of the plate is left a little ear, somewhat longer than the thickness of the skull, these little ears I bend both one way so as they be perpendicular to the plate; and so much of them as exceeds the thickness of the skull, I bend outwards again, that thereby they may rest upon the skull, and by which as by two little handles, I may lift them up with pincers, if need be at each dressing; these two little handles may be cut something broader than the two pieces that join them to the plate, which must be of an equal breadth. When I use it I dip it in some

proper medicine pretty warm and apply upon it a very soft pledgit of fine lint." He then describes a fivefold advantage from the use of the above-mentioned plate, viz. 1st. It facilitates the exit of matter or blood from within the skull and which is imbibed by the lint. 2d. It produces this effect by lightly pressing on the dura mater. 3d. It prevents the formation of fungus. 4th. It prevents the dura mater from being injured against the edges of the perforated bone. 5th. It defends the bone and its membranes from the access of air, and supplies in some measure the part of the boney substance removed.

(w) VAUGUION observes that "the incision of the teguments must be made after some of the following ways, viz. On the temporal muscle it

(w) Vauguion's *Chirurgical operations*, 3d Edit. p. 172.
Lond. 1716.

must have the figure of 7 or letter V, or which is better, be made lengthways, following the course of the fibres, and be large enough to place the instrument. In all other places of the head, the incision is ordinarily made in form of a cross \dagger , but I think the long T is better, provided there be room enough to apply the instrument." The pericranium is to be scraped off by a spatula or the nails. At p. 173 and 175, he applies to the dura mater a linen findon dipt in honey of roses and spirit of wine in the usual manner, over this findon another armed with proper medicines, &c.

(x) VAN HORNE describes the incision of the scalp as being made in a simple line, or in the form of a cross, or of a triangular figure; always having a regard to the futures and temporal muscles. He directs the teguments to be

(x) Van Horne's Micro-technie by Banyer, P. 75. Lond.
1717.

removed, and the pericranium to be scraped off the skull with the nails or a spatula. At p. 77, Upon the dura meninx of the brain, he pours a little warm oil of roses. At p. 78, to deterge the membrane he uses a piece of fine linen (sindon) dipt in honey of roses and a little spirit of wine, applied in the usual manner; to the cutaneous wound digestives are to be used, but to the exfoliation of the bone cephalic powders.

(y) MANGETUS recommends (if there be no wound of the scalp) a simple, crucial, or triangular incision to be made; the pericranium to be totally separated from the cranium by a separatory instrument. At p. 593, for the mundification of the dura mater, he applies mel. ros. with a little spirit of wine, over that a sindon; he sprinkles cephalic powders on the

bone to dry it, digestives to the wound of the scalp, such as B. Peruv. Copaiv. &c.

(2) JUNCKER in his Chapter de Trepanatione, speaks of three forms of incision then in use, viz. the crucial, or the form of the letter X, the letter T, and the triangular, or the form of the letter V. He orders the incisions to be made with a firm and steady hand, so that the portion of the scalp, which is to be cut, be divided together with the pericranium at one stroke, unless we suspect, or in cutting apprehend the fractured bone to be broken into many pieces. Where the pericranium is not equally divided by the first incision, let it be afterwards cut with greater circumspection. At p. 620, after the operation, he says the dura mater is to be particularly dressed with good

(2) *Johannis Junckeri Conspectus Chirurgiæ*, P. 616.
Hala 1721.

balsamics applied on lint, avoiding oil or acrid applications; the essence of amber mixed with a small quantity of the essence of myrrh is commended for this purpose. A small quantity of the spir. terbinthinæ may be added to the above, but not too much, as it may endanger inflammation, and copious suppuration.

(a) TURNER acquaints us, that he made a triangular incision upon the body of the temporal muscle, in the presence of Mr. Serjeant Bernard and some others; without any inconvenience, except a little hæmorrhage, which was easily restrained by compresses, &c. He observes that “some propose this incision to be made in the form of the figure 7, others like that of the letter V, some in a semicircular, and others circular, taking out the piece, as I

(a) Dan. Turner's Surgery, Vol. I. P. 366 &c. Lond. 1722.

have seen Mr. Bernard, in the superior part of this muscle to make way for the trepan: but this must be left to the operator." In vol. II. p. 188, He directs us to make a cross—incision, or in other forms more advantageous through the scalp to the bone, with a removal of the pericranium. At p. 197, speaking of a fracture of both tables of the skull with depression, he prefers the circular incision of the scalp, taking out the piece, especially if the compass of the bone beat in be not exceeding large. This mode of incision he used in the remarkable case which he published in the year 1709, in which case, after the operation, he dressed the dura mater with findons of white sarsnet dipt only in mel. ros. applying dry lint upon the lips of the wound, and a digestive over all. But in vol. II. at p. 194, he says, there is nothing better than the warm liniment of Arcæus, or Wiseman's medicine

cine

cine composed of oil of roses and rosin, for the first dressing to the dura mater. And at p. 195, he adds “when the membrane is digested, mundified and incarnated, with these or the like remedies, so that the flesh begins to rise up even with the upper edge of your perforation, you are then, or rather earlier, to dress up dry, lest otherwise a fungus rise, as frequently happens in these cases (though I believe usually by the want of timely care to prevent it) and give you great disturbance: to obviate this, I have sometimes sprinkled the pulv. ros. rubr. cort. granat. flor. balauft. or such like; continuing those exiccating remedies ’till the new flesh begins to harden, and the edges of the bone mouldering off, turn into a sort of callus, being by length of time afterwards as it were ossified, and proving usually as strong a fence, as other parts of the skull.”

(b) GARENGEOT teaches us that in order “to discover a fracture of the skull, attended with a wound of the hairy scalp, the incisions that are made in it, ought to be so directed as to pass through the angles of the wound, if it be possible, to avoid causing a deformity, and not to destroy the skin without necessity.” At p. 387 he tells us that he has seen great practitioners generally make the crucial incision, even upon futures, and the crotaphite muscle, without any accident arising, but upon the crotaphite, frontal, and occipital muscles, he prefers a “longitudinal incision according to the direction of their fibres, and that it may the better uncover the bone in the fractured part, he makes it longer; and if that incision is sufficient to apply the trepan, the wound is sooner cured, and with less deformity. But if the fracture is so considerable,

(b) Garengeot's *Chirurg. Operations* revised by Mr. St. Andre, P. 386. Lond. 1723.

that the longitudinal incision cannot uncover the bone, it ought to be made cross-wise." He advises to cut "as much of the pericranium as of the skin, and even more, to avoid the drawing of the former, and the bridelings it would form in the angles of the wound, which would quickly be attended with an inflammation, and other sad accidents." He repeats at p. 389, if the longitudinal "incision is sufficient to discover the fracture, and to fix the trepan, the surgeon does not extend it further, but when the disease is more considerable, he makes a second incision, which cuts the first in the middle." Afterwards he directs the pericranium together with the angles of the wound to be separated from the cranium, lest the former make any bridelings, which must be cut "for they frequently occasion some accidents which deceive the surgeon." At p. 403, after the operation, he applies to the dura

dura mater a linen findon, in the usual manner, upon which he pours a few drops of white balsam of Fioraventi a little warm, over this he lays small round pledgits the size of the perforation, dipt in the same balsam, so as to fill it up, to compress the dura mater gently, and to prevent fungus. Over these small pledgits, he lays two other larger, dipt in the same medicament. To the lips of the wound he applies pledgits with a digestive ointment, retaining the whole by the couvrechef.

(c) LE CLERC recommends incisions of the scalp in the form of a cross +, the letter T, figure 7, and the letter V, or a simple incision occasionally. The lips of the wound must be separated from the skull either with the fingers, or some convenient instrument. His

(c) Le Clerc's Compleat Surgeon, P. 188. Lond. 1727.

dressings are spir. vini and mel. rosar. mixed, upon a linen findon, &c.

(*d*) MAGATUS inveighs against the crucial incision of the scalp, recommending a longitudinal one on the authority of Hippocrates ; observing at the latter part of the same paragraph, that if a longitudinal incision be not sufficient, as sometimes may happen, in injuries of the forehead, he then would recommend the triangular. He observes that the incision and separation of the pericranium, should not be made over a future, but at its sides. At p. 298, after the bone is perforated, and the dura mater cleaned from the blood with cotton, he applies one or two drops of terebinthinalota, or ol. rosar. or refin. mixed with oil, and a digestive ointment to the lips of the wound, &c.

(*d*) Cæsar Magatus de rara Medicatione Vulnerum, Vol II. Lib. 2. Cap. 29. P. 288. Francofurt, &c. 1733.

(e) NUCK orders the integuments of the cranium to be cut with a knife, (unless there be a wound already made) in a simple line, or in form of a cross or triangle, avoiding, as much as possible, the temporal muscles and the sutures. The lips of the wound are then to be separated, and the pericranium perfectly scraped from the cranium, with the separatorium of Solingen. At p. 21, he orders the dura mater to be dressed with a sindon, dipt in mel. rosar. et pauxil. spir. vini, to be continued 'till all the humours are evacuated, and the symptoms vanish. He sprinkles cephalic drying powders upon the bone, and dresses the rest of the wound with digestives, &c.

(f) DE GORTER says, if the wound of the scalp be too narrow for

(e) Anton. Nuck. Operat. & Exper. Chirurg. p. 17. Lugdun. 1733.

(f) Joh. De Gorter Chirurgia Repurgata P. 66. No. 314, Lugdun. 1742.

the

the purposes he wants, the integuments are to be cut transversely, the length of the wound, by a sharp knife down to the bone; the incision is to be made from the sound part towards the wound, first in the inferior lip, according to the situation of the body, then in the superior lip. At No 315 he proceeds, if there be no wound of the integuments, to direct a crucial incision like the letter X, to be made with a steady hand down to the bone, that the pericranium may be divided at the same time. At p. 70, No. 340, he observes, if the fracture happens near to a future, it is to be uncovered by a section in the form of the letter T. P. 71, No. 346, he orders the pericranium to be separated from the bone with a blunt instrument. At p. 74, No. 356, after the perforation, he directs a linen sindon, dipt in honey of roses, with a little spirit of wine, to be applied warm to the

the

the dura mater, in the usual manner. He carefully fills up the aperture with dossils of lint, and over them applies a square compress, retaining the whole with moderate pressure by a roller, a napkin, or a head-bandage. Within 40 or 50 days an exfoliation from the margin of the trepanned part will take place; then the skin is to be brought nearer together by sticking plaisters, and we must wait until the aperture be filled up with flesh, and a sort of cartilaginous substance. At p. 75 (No. 358) he says, luxuriant flesh is to be restrained by moderate compression, or destroyed by powdered savine, burnt alum, or sugar of lead; if it be large the projecting part may be cut off, concluding the subject thus, “*Fungus Cerebri excrescit ex incisia Chirurgi, &c.*”

(g) HEISTER says, “ the incision of the integuments may be made in the form of a cross \dagger , or in the figure of the letter X, V, or T, large enough to admit the crown of the trepan upon the bone. After your incision is thus made, you must elevate and separate the integuments and periosteum from the cranium by the edge and handle of the scalpel.” At p. 363 after the perforation is made and the dura mater cleaned, he recommends the application of a round pledgit of dry lint with a thread fastened to it; upon this pledgit he pours a little mel. rosar. diluted with a little spir. vini, filling up the perforation with other pledgits of lint; then directs the cranium and wound itself to be dressed with lint spread with a mild digestive ointment or mel. rosar. upon which he adds a square ompress dipt in warm spir. vini, or

g) Heister's Surgery, Part 2d. Sect. 1. P. 539. Lond. 1743.

sp.vini camphor. cum aq. calc. securing the whole without a plaister by the capeline or head bandage. In the space of 40 or 50 days an exfoliation of a thin plate from the trepanned margin of the bones will usually come away, then new flesh will appear and callus shooting up from the clean bone and dura mater will at length fill up the whole cavity; when the cavity is about half filled, the sprouting flesh and callus are to be moderately pressed by lint and bandage to prevent them from being too soft and lax; and when it has arrived even with the surface of the bone of the cranium, you must endeavour to conjoin and extend the integuments over it by sticking plaisters, that the new formed substance may intimately unite with the super-induced skin.

(b) SHARP says “the manner of

(b) Sharp's Treatise on the Operations of Surgery, 5th. Edit. 1747. P- 138.

treating a fracture of the cranium will be according to the nature of the fracture itself, and the injury of the scalp; if the wound of the head be tore into angles, perhaps cutting off the lacerated flaps will make room for the saw; if the bone be broke into several pieces, the pieces may be taken away with the forceps; or if some of the skull be also depressed, the removal of the pieces will, without perforating, make way for the elevator to raise the depressed part; but if the fracture be not complicated with a wound of the scalp, or the wound is too small to admit of the operation, which seldom fails to be the case, then the fracture must be laid bare, by taking away a large piece of the scalp. It is a fashion with some Surgeons to make a crucial incision for this purpose, which they prefer to the other method, upon the supposition that the wound will more easily heal again

again after the operation, by turning down the flaps, and in case we find no fracture, which sometimes happens after scalping, that by making this species of wound, an exfoliation of the bone, and tediousness of cure will be avoided. But whoever has seen the practice of the crucial incision, must be sensible of the false reasoning which is used in its favour," &c. At p. 140, he says, " I think it is indispensibly right at all times to take off the scalp when we lay bare the cranium, with a view to the operation, which seldom fails to granulate with flesh in a few days, if dressed only with dry lint, and rarely grows carious, &c. The form of the piece of scalp taken away, may be nearly circular, and to be better assured of the course of the fracture, it will be proper it should be of the whole length of it. When the scalp is removed, the periosteum must be raised. At p. 149, after

the operation he remarks, “with regard to the dressing of these wounds, I think it is very certain, that as the greatest part of the evil proceeds from the quantity and pressure of the matter, whatever approaches towards the nature of a tent, and increases its quantity and pressure, by locking it up, must be pernicious: therefore I would exclude the use of all bindons. whatever, the hasty application too of spirit of wine which is so commonly advised cannot be proper, as they are not only unfit for inflammations in general, but also crisp up the vessels of the dura mater and brain, and stopping the suppuration sometimes produce a gangrene. Since then a close application is inconvenient, and whatever good there may be in topical medicines, it cannot for the most part be communicated to the abscess, by reason of its extent beyond the orifice; the best remedy will be dry
lint

lint only, which must be laid on loosely to give vent to the matter, and be repeated twice a day 'till the discharge is lessened, when once in twenty-four hours will be sufficient to the finishing of the cure, which will be something retarded by the exfoliations that sometimes follow this operation."

(i) LE DRAN observes " If there is a contusion without an external wound, the extent of the contusion ought to determine the figure of the incision which must be crucial, angular, or in the form of a T, according to the place upon which it is to be made, and in this respect the vicinity of a future, which ought not to be exposed unnecessarily, will make one method preferable to another; if it is allowable to chuse the figure of the incision, I should prefer

(i) Le Dran's Operations in Surgery, P. 391. Lond. 1759.

either that in the form of the T, or that of an angular shape, rather than the crucial, as the last requires three incisions, whereas the others are made with two, add to this that the crucial incision leaves four angles to be cut off, the others fewer so as to spare the patient a considerable deal of pain." And he further observes "when the angles of the incisions are very large, part of them must be taken off, but no more than is necessary in proportion to the fracture, as the surgeon should endeavour to save as much of the scalp as possible, particular care should be taken to separate the pericranium very well at the angles."

At p. 392, he says, "when the wound has been made by puncture or incision, and the pericranium is not separated, the point of the bistoury must be passed through the teguments down to the bone in order to divide the pericranium together

together with them, this done, either with the nails or a spatula we must separate the pericranium which adheres to the skull very closely, and then cut off part of the lips of the wound. Where the wound is made by a bruising instrument, the aponeurosis is contused and sometimes also the pericranium, the aponeurosis may likewise be lacerated; in these cases the wound must be dilated, and the bone laid bare, to which the contused pericranium sometimes adheres but very slightly, and the wound should be made uniform, by cutting off the lips, once more let me observe that the aponeurosis and pericranium be well separated at the angles.”

At p. 395, if the dura mater is found, he applies “a sindon dipt in a mixture of mel. ros. and brandy, if it is very red, it is a proof of its being inflamed, and must be dressed in the same manner, but if it is quite white or of a livid colour it should be brought to sup-
puration

puration, and therefore the sindon should be dipt either in the green balsam, or a mixture of honey of roses and spirit of turpentine, in order to hasten digestion. He covers the sindon with small pledgits to fill up the perforation, dressing the rest of the wound according to art, &c. observing at p. 397, that after exfoliations have taken place, and granulations have shot up from the bone and the dura mater, they will unite and fill up the perforations, and the wound will soon heal.

(k) Mr. CHESELDEN in his observations annexed to Mr. Gataker's translation of Le Dran's operations in surgery, at p. 445, gives two plates to illustrate his manner of denuding the cranium, previous to the operation of the trephine; whence we learn, that

(k) Printed at London 1749.

he removed a somewhat semicircular piece of the scalp, sufficiently large for the purpose. At what time he first practised that form of incision I cannot precisely learn; but from the date of the third edition of his anatomy, which is amongst my collection of books, it must be previous to the year 1726; as he therein relates a case of fractured skull, in which he employed that method of scalping.

(1) PLATNERUS says, if there be no wound already made in the scalp, he prefers incisions in the form of the letter X, directing the pericranium to be separated from the bone, for if it be lacerated by the terebra, it would produce fever with inflammation. At p. 308, he again directs as above, that the skin be incised even to the bone, where no wound is already made, which

(1) Platner. Institut. Chirurg. p. 292, Lipsiæ 1758.

may be most conveniently done by making two incisions in the form of the letter X; nor is it uncommon to incise the skin by two lunated lines, the ends of which are to be turned towards each other, and to cut off the circular portion. If the foramen is to be made near to a future, incisions in the form of the letter T are most convenient. But if the crotaphite muscle is to be divided, that section is to be preferred which represents the letter V, so that its vertex be in the inferior part, and its basis in the top, and at the os bregmatis. He says it seems very cruel immediately to cut off the angles of the incised scalp with a pair of scissars, it is better to leave them and place lint between them and the bone. At p. 312 and 313 speaking of the cure, says he, if the membrane of the brain be laid bare, but otherwise entire, the best application to it, is a sindon of clean
fine

fine linen, which is to be placed within so that it pass under the edge of the skull, through this a soft thread is to be passed, the ends of which are to be tied together and to be left out of the wound, so that it may be conveniently taken away, &c. Over that findon dry lint is to be applied, especially if all the humour cannot be evacuated, for so the lint may imbibe it. If the dura mater becomes inflamed, he applies to it a findon, sprinkled with vulnerary water, to which a little amber, mastich, and saffron may be added. But he observes, that these medicaments should not be acrid nor prepared with salt of tartar.

(*m*) VAN SWIETEN tells us from § CCLIX of Boerhaave's aphorisms, &c. that the part is to be laid bare, 1st. by incising the injured teguments with a

(*m*) G. L. B. Van Swieten Comment. in H. Boerhaave Aphorism. pag. 425. §. 259. Ed. Lugdun. 1766.

scalpel, down to the bone, by a straight, angular, perpendicular, or crucial incision, cautiously in fractures with loose fragments, chusing either one form of incision or the other, according to the diversity of the part and of the injury. 2ndly. By separating the incised teguments from the skull exactly, with a scalprum. 3dly. By filling the wound with lint.

At (p. 424) Van Swieten in his commentary on the above, recommends a simple incision of the scalp, when the injured part is so small, that it may be viewed by raising the lips of the wound only. An angular section, he says, is convenient when the part injured is not very large, yet larger than can be uncovered by a simple incision. When a still larger space is to be uncovered, a simple incision is to be made in the line of a tangent to the affected part,

to

to which must be added another cut perpendicular to the former, passing through the center of the affected part. But when a very large portion of the bone is required to be laid bare, a longitudinal incision is to be made through the middle of the affected part, and intersected in its middle by another longitudinal incision, and thus by raising the four angles of the incised integuments, the whole space, intersected by the two incisions, may be uncovered. At p. 424, he says, the edge of the knife, in making the incisions, ought directly to touch the bone, and thus by raising it, the pericranium may be also divided at the same time. At p. 425, he directs the pericranium if it adhere strongly, as is very often the case, to be separated from the skull expeditiously with a well polished ivory scalprum. At p. 479, in the latter part of §.CCXCII, Boerhaave advises the perforation of
the

the bone to be filled and covered with fine soft lint, dipt in a medicine proper for membranous parts, and then a plate of lead with ears properly adapted to be applied. But at p. 480, Van Swieten recommends the application of a findon to the dura mater after the usual manner, directing a few drops of warm Peruvian balsam, or of some other similar vulnerary balsam, to be instilled upon it, &c. together with Belloste's plate of lead to prevent the rise of fungus.

(o) GOOCH says, that the incision of the scalp should be made with a knife appropriated to this use, of a circular, elliptical, or other figure as the circumstance of the case require, and that “the scalping should be of such extent as may give a fair opportunity of making as many perforations as shall be found

necessary, as far as the surgeon's judgment and observation can direct him. He ought not to be sparing in this respect, lest he should be under the disagreeable necessity of extending the incision further. The manner of cutting, is to apply force enough to the knife to carry it quite through to the bone at once, not bearing too much upon the point, especially if he cut over loose fragments." At p. 304, he says, "the pericranium is to be raised a little, with the point of the knife quite round the incision and then the scalprum used, which will be found the best instrument to clear the bone of that membrane as I have found by frequent experience." At p. 312, he observes "the membranes may be dressed with ung. e gum. elemi extolled by Franciscus Arcæus the inventor of it, made of a softer consistence with bals. copaiv. or some other natural balsam; applying it just warm with a feather

and soft lint lightly over it ;” dressing the other parts with the same unguent. spread on lint, &c. securing the whole with compress and gentle bandage.

(*p*) PLENCK says, the denudation of the skull by which the place is prepared for trepanning, is performed by incisions with a scalpel ; by which the integuments of the skull should be cut down to the bone in the form of an X, or T, and be separated from the skull with a scalprum. At p. 78, we learn, that his dressings consist of a fine linen sindon ; over that a thin plate of lead perforated with ears ; a firm round dossil ; several small pledgits ; compresses wet with a cephalic fomentation ; and the whole to be retained by a head-bandage or a linen cap.

(*p*) Jos. Jac. Plenck *Compend. Institut. Chirurg. Parte 3.*
P. 77. Viennæ, 1775.

(q) KÖLPIN says, when the integuments are incised cross wise, or in any other more convenient form, and the pericranium separated, there are some who chuse to cut off the lips of the wound entirely, others only in part, and others again dissuade from removing any portion of them, lest the cure be afterwards protracted. But he, at p. 53, directs a small part of the lips to be cut off, to make room for the application of the terebra: and at p. 42, says, the subsequent dressings, should consist of a few drops of ol. terebinth. and be applied on lint to the dura mater, &c.

(r) Mr. WILMER relates “the history of a fracture and depression of the scull, no symptoms of which appeared untill the fourteenth day after

(q) *Alexand. Kölpin de Capitis læsionibus Meletemata Medico-chirurgica*, P. 52. Haun. 1777.

(r) *Mr. Wilmer's Cases and Remarks in Surgery*, P. 42, &c. 1779.

the accident. A Chaise-driver, says he, at one of our inns, applied to me on account of a wound he had received in his forehead, and he particularly desired I would examine the state of his scull, which he was apprehensive was broken. He informed me that the day before I saw him, he was sitting before the body of his master's chaise, between Atherstone and Nuneaton, and stooping forward to adjust some part of the harness which had been disordered, he received a kick from one of the horses.

“ He perceived he was wounded, that he bled very much, and to stop the hæmorrhage, he jumped off the carriage, and filled the wound with sand. When he arrived at Nuneaton he applied to a surgeon, whom he likewise desired to examine the state of his scull. The boy was very well when he
came

came to me in every respect, except the wound in his forehead.

“ After I had washed out the sand and dirt, I proceeded to examine the state of the subjacent parts. The pericranium seemed bruised, but it was not *detached* from the bone. The patient came every day to my surgery to be dressed, and (against my directions) continued to look after horses, and drive chaises as usual.

“ In the space of fourteen days, the wound upon the upper part of the forehead was almost healed. He then began to complain of a giddiness of the head; and when this symptom commenced, he was ordered to lose some blood, and to be kept very quiet: ---Notwithstanding the directions that were given upon this occasion, the vertigo increased, accompanied with

F 3

a pain

a pain of the head; and to these symptoms supervened a defect of memory, and a general loss of strength. It was now apparent that there was some latent mischief; the wound was therefore inspected with particular attention. One part of it appeared more flabby than the rest, and upon pressure, a small quantity of sanies was discharged. I pushed a probe through the fungous part and passing it upward under the scalp; discovered a roughness on the surface of the right parietal bone, near to the sagittal future, and more than three inches from the wound of the forehead.

“ Having made an incision through the scalp over this part, I discovered a fracture, attended with very considerable depression of the bone.—By two applications of the trephine, assisted by Mr. Simpson, surgeon of Glasgow, the whole

whole of the depressed portion of the scull was removed.

“ The symptoms did not in the least abate *immediately* after the operation: the pressure of the fractured os parietale upon the dura mater, having occasioned an inflammation of that membrane. The cause was removed, but the effect seemed to remain. Although the patient was three times bled, within a small space of time after the operation, and in other respects, a strict antiphlogistic plan was pursued, yet the disease of the dura mater went on from inflammation to mortification. The patient was trepanned on the 7th of June, sixteen days after the accident happened; and on the 15th, the dura mater sloughed off in a putrid state. The bad symptoms decreased after this event; but there was a troublesome fungus from the cortical substance of the brain, and a considera-

ble portion of it came away in the subsequent dressings.

“ The patient, after the febrile symptoms disappeared, became very languid ; but by a liberal use of the bark, he gradually recovered his strength, and in despite of all remonstrances, began again to pursue his irregularities. He was often drunk, ran about the streets, attended the business of the stables, and, notwithstanding all he could do to prevent it, nature still prevailed and healed his wound.

“ In this case it appears very probable, that the wound of the forehead was occasioned by one part of the horse's shoe, and the fracture of the parietal bone by another.

“ The present method of removing a large circular portion of the scalp, previous

previous to the operation of the trepan, appears to me not only a very unnecessary, but a very inhuman practice. It removes the seat of the hair, exposes a larger quantity of the surface of the bone than is necessary, (rendering thereby an exfoliation almost unavoidable) considerably retards the cure of the wound, and when, at last, the parts are healed after this operation, they will experience the loss of that defence, which the thick skin and the aponeurosis of the occipito-frontalis muscle, forming the scalp, would otherwise have yielded to them.*

“ In several cases of fractured skulls that I have been concerned in, and in which it was necessary to apply the trephine more than once, the cure hath

* Nuda enim caro, si sine cute relinquatur, ægre ad cicatricem perducitur. Galen. Comment. 3 in Hippoc. de fracturis. Charter. tom. XII. Pag. 254.

been accomplished without removing any portion of the scalp; and the wounds were healed in half the time, that must have been employed, if excision had taken place. In two of these cases the injury was in the forehead; by pursuing the above method, a very considerable deformity was avoided: and I have seen but one case, thus treated, where an exfoliation of the bone was necessary.

“ To make a proper dilatation of the wound for the admission of the trephine, I pursue the track of the fracture with the knife, in whatever direction it appears to take.

“ If the circumstances of the case make it proper to expose a portion of the scull, in a form nearly circular, the old way of making two incisions, intersecting each other at right angles and afterwards dissecting back the flaps, will denude the subjacent bone full as well,
for

for every purpose of the operation, as if all that part of the integuments had been cut off. *

“ If it is not, therefore, absolutely necessary to remove any portion of the scalp, even when the scull is *extensively fractured*, how very irrational and cruel is the practice (which I have too often seen) of *scalping* the patient, even upon the *suspicion* of a fracture; protracting thereby the cure to three or four months, which otherwise might have been accomplished in almost as many days.

At p. 134, he relates another case beginning thus “ On the 5th of November, 1778, John Sneith, a boy fifteen years of age, received a violent blow upon the head from the edge of an

* Quæ duabus transversis lineis literæ X figuram accipit, ut deinde à singulis procedentibus angulis cutis subsecetur. Celsus de medic. Lib. VIII, Cap. IV. p. 516.

iron-hooped pail, which fractured the scull. Although a considerable portion of the os frontis was depressed, the boy was exempt from most of those symptoms, which usually attend such accidents; and the day after he received the blow, he was very sensible, and could walk about.

“ At this time, in consultation with Mr. Harrold, it was agreed, by repeated application of the trephine, to remove all the fractured portion of the bone. After the operation (which was performed *without cutting off any part of the scalp*) he was kept quiet, and a clyster was directed.

“ The next day he was feverish, complained much of his head, and vomitted.* As the clyster given the day of

* From the wonderful sympathy which prevails betwixt the head and the præcordia, Scultetus observes, that almost all those who receive wounds of the head, complain of a bitter taste in the mouth. Scultet. Arma-ment. Chirurg. p. 198.

the operation had not procured any evacuation, he was ordered another, in which an ounce of Epsom salt was dissolved. This had no better success; and in the course of the day he had two more clysters, neither of which answered the intended purpose; and his nurse supposed they came up by the mouth, as the sickness and vomiting were always occasioned as much after them, as when he took any thing into the stomach.

“ Some blood was taken from the arm, and a small pill was administered, containing one grain of opium and three of calomel. On the third day from the operation, the hopes of his recovery were small; the fever increased, attended with continual vomiting, by which the contents of the intestines were discharged upwards. Clysters were repeated but no stools were procured; and

and it appeared evident that the peristaltic motion of the intestinal canal was *totally inverted*. In the evening he became delirious, and it required constant attention to keep him in bed. He had taken, during the day, saline draughts, in a state of effervescence, with a few drops of laudanum; but neither these, nor any thing we could contrive, staid upon his stomach longer than a few minutes.

“In this deplorable state of the case, when every effort of art proved so absolutely inefficacious, a large blister was applied *round the navel*, and its success much exceeded our expectations. After the blister had been upon the abdomen four hours, the vomiting ceased and *never returned* afterwards. Before the next morning he had two stools, and was in many respects better, although he still continued very ill.

ill. The delirium was gone, but he had great pain in his head; his pulse was quick, and in the evening of the fourth day he was so restless, that we thought it necessary to give him an opiate.

“ On the 5th he was much in the same state, and this night he had several stools, which were succeeded by a strangury, and such a violent irritation of the rectum as to occasion a constant tenesmus. An erysepelatoſe eruption also covered the whole surface of the body. The strangury and tenesmus were attributed to the action of the cantharides, and they were, after some time, relieved by drinking a decoction of marsh-mallow roots, and a solution of spermaceti with a proper quantity of thebaic tincture.

“ On the seventh he was much reduced in strength, but continued sensible; his face

face was pale, his pulse languid, the wound dry, and shewed not the least disposition to digest; and the circumjacent parts were flabby and œdematous. The bark was then given, and repeated until the eleventh day, when he was much better; his strength increased, and the edges of the sore wore a more favourable aspect; but the surface of the dura mater was still black and putrid. The parts were dressed with an antiseptic balsam, composed of mel. rosar. & bals. traumat. aa. p. e.

“ The dura mater soon afterwards sloughed off, and a fungus arose from the brain; but this appeared to have been restrained by dry lint, assisted with moderate pressure. The patient continued to mend every day, and on the 12th of January the wound was completely cicatrized.”

MR. POTT

(5) Mr. POTT, says, "if the integuments are not wounded, or if the wound made in them be so small as not to admit a proper examination of the bone, and the circumstances of the case are such as render such inquiry necessary, a portion of the scalp should be removed. The manner of doing this has formerly been the occasion of much difference of opinion; but there can be no doubt about the greater propriety of removing a piece of the scalp for this purpose, by an incision in a circular form, it being that form which must afford the clearest view. If there be no wound, the point stricken should be made the center of the incision; if there be a wound, such wound should be made the center

(5) Mr. Pott's Chirurgical Works, vol. 1. P. 168, &c. London 1779.

The above extracts are taken from this edition of Mr. Pott's observations on injuries of the head from external violence, in preference to that which he published in 1760.

of the piece to be removed ; and such piece should always be of size sufficient to render the application of the trephine easy.

“ If the scalp be wounded, and the wound be large enough to render the fracture visible, the course of that must be the operator’s direction in making his incision ; and if the skin be much torn or bruised, or spoiled, it will generally be found advisable to take away all that is spoiled at once ; as the removal of it will add very little to the patient’s pain, or the length of the cure, and the leaving it on in this state may be attended with great future inconvenience.

“ Scalping (as it is called) should always be executed with a knife, and that knife should be so held as to cut through the skin and pericranium in a perpendicular

perpendicular manner, down to the bone at once, that the size of the bare bone may be fully equal to that of the wound of the scalp."

At p. 171, he says, "no part of the scalp should be wantonly or unnecessarily cut away; but it should always be remembered, that this operation is, and should be performed with intention to bring, if possible, the whole fracture into sight; and that whatever falls short of fulfilling such intention (if practicable) is wrong, not only, as it does not immediately answer the purpose for which it is intended, but it generally puts the patient under a necessity of undergoing the same pain and trouble a second time."

At p. 227, he remarks that after the operation of the trephine is compleated, "the bare dura mater should be dressed

as easily and lightly as possible." And at p. 229, speaking of the general treatment of wounds of the brain, he further remarks that "the dressings proper in these cases, are not at all different from those which ought to be used, where neither the brain nor its meninges are hurt. They should be soft, light, and not consist of any thing greasy, or which can possibly irritate or inflame; nor should they be applied in such manner or quantity as to press or obstruct the free discharge of fluids of any kind. Soft dry lint is perhaps equal to any or all others. In the chirurgical writers are to be found a great many formulæ, but whoever places confidence in them, for any supposed merit of their own, will find himself much disappointed." Respecting bandage, he remarks at p. 230, that "all that can ever possibly be wanted in these cases from bandage must be, merely to keep the dressings in their place without

without any degree of confinement or pressure; and this purpose will always be better accomplished by a loose cotton or yarn night-cap, than by the nicest and most elaborate bandage that ever was invented."

(1) Mr. AITKEN says, "Facts uniformly demonstrate that cicatrization is protracted merely in proportion to the destruction of the integuments; their excision therefore from the portion of the cranium to be trepanned (a destructive practice named scalping*) is rationally superseded by incision and separation of proper form and extent.

* Scalping, preparatory to trepanning, which is strongly inculcated by Mr. Sharp, and some other modern Surgeons, seems not to have been much practised by their predecessors.

Nimis durum videtur, mox angulos sectæ cutis forcice præcidere; præstat illos relinquere & inter eos atque os linamenta ponere. Platneri Institut. Chirurg. §. 565.

(1) Mr. Aitken's Systematic Elements of Surgery, Page 415 No. 497. Edinb. 1779.

---For self-evident causes, detaching any part of the pericranium and dura mater from the cranium is, as much as possible to be avoided."

(u) Mr. WARNER remarks that after having properly seated the patient, "the surgeon with a round-edged knife (such as is made use of in cutting for the stone, and on many other occasions) must make a circular incision, at least as large as a crown-piece, through the scalp: which is to be dissected up from the subjacent bone: when the scalp is removed, which can seldom be so effectually done as to clear away the tendinous expansion of the *occipito-frontalis* muscle, and the *pericranium* at the same time, the surgeon must proceed to a further removal of these parts, till the bone becomes.

(u) Mr. Warner's cases in Surgery, 4th edit. p. 53. Lond. 1784.

quite bare." At p. 57, he says, "it may be observed, that I have directed a piece of the scalp, as big as a crown-piece, to be cut away, previously to the use of the trepanning saw; but in some instances it will be found necessary to differ from this rule, and to take away a piece of the scalp at least three times as large, since fractures are sometimes found to extend quite cross the scull, even from one temporal bone to the other."

At p. 58, he observes "the manner of treating the wound or wounds, immediately after the operation of the trepan, must first be by stopping the *hæmorrhage*; this may in general be done without tying the vessels; the next thing to be done is to wipe clean the surface of the *dura mater* with a bit of soft sponge dipt in warm water, or with a piece of lint secured upon the end of a probe, and

dipt in warm oil; after this, dry lint is to be laid loosely upon the whole surface of the wound. The lint may be covered with a pledgit of tow spread with *ceratum album*, or any other cooling ointment that has neither turpentine nor resin in it; which ingredients very often prove too stimulating to the skin when long continued, and occasion troublesome itchings, attended with inflammations."

(v) Mr. BELL observes, "When the symptoms of a compressed brain are evidently marked, we ought, without hesitation, to proceed to examine the state of the cranium wherever appearances clearly point out, or even where they lead us only to conjecture where a fracture is. We do this by laying the bone bare by making an in-

(v) Mr. Bell's System of Surgery, Vol. III. Chap. 26. §. 3. P. 40. Edinb. 1785.

cision with a scalpel through all the external coverings of the skull.

“ In performing this operation, when the bone is previously found to be much injured, which in some instances is the case even where no laceration occurs in the skin directly above it, the incision through the integuments should be made with much caution; otherwise the brain may be hurt, either by the knife pressing in some portion of detached bone upon it, or even by the point of it passing in between two of the separated pieces. But when the bone upon which the incision is made, is not either broke into different pieces, or when the edges of the fractured pieces have not receded from one another, and do not in any degree yield to pressure; the division of the skin and other teguments may be then performed with freedom, by cutting through

thro' the whole of them down to the bone, with one stroke of the scalpel.

“ The sole intention of this operation is to bring those parts of the bone which have been injured clearly into view; but altho' the means of effecting this ought to be extremely simple, a very painful and severe method has been commonly recommended.---It has been in general supposed, that in fractures of the skull, the parts affected cannot be sufficiently exposed, either for the purpose of tracing the course of the fracture, or, when necessary, for applying the trepan, unless a portion of the skin and other teguments be altogether removed: and with this view, some have advised a crucial incision to be first made, and the corners to be cut off. Others have recommended an incision of the form of the letter T; while by many we are directed to remove a circular

circular or oval piece of the teguments at once.

“ Various objections, however, occur to all of these.--They not only produce a painful wound, which is commonly very difficult to heal, but by exposing a considerable part of the skull tedious exfoliations sometimes take place, which might have been prevented; and the covering which nature afterwards provides for the denuded bone never answers the purpose so completely as the teguments which were removed. Even all of these objections, however, to the practice we have mentioned, should be considered as trifling, and ought not to be attended to, if by more simple means we could not discover the extent of fractures, and if we could not likewise by the same means apply the trepan, or any other remedy which the treatment of them might require. But

as both of these objects can perhaps in every instance be accomplished by a less exceptionable method, the other ought to be laid aside.

“ Upon a simple incision being made in the manner we have directed, the teguments always retract so considerably as to admit of a very free examination of the now denuded bone ; and if a fracture is discovered, its course may be always traced just as effectually by this incision being extended along that part of the bone in which it is found to run, as if a considerable portion of the teguments was removed : and the same retraction of the divided parts will in almost every instance admit of the application of the trepan. In a few cases, it may be necessary to remove a small corner of the teguments, which have been divided : but this I know from experience is very seldom the case ; and
whenever

whenever it is found to be so, a very small portion only of the scalp should be taken away."

At p. 54, He says, in the treatment of fractures attended with depression of the skull, "it sometimes happens, that the corresponding teguments are either altogether removed by the cause which produced the injury, or at least are so much lacerated as to admit of a free examination of the bone; but when it is otherwise, and the teguments are either not divided in any part, or are not sufficiently laid open, the first object of the surgeon, as we have already observed, should be, to get the head shaved, and then to divide the skin and other teguments with a scalpel through the whole extent, and directly upon the course of the fracture or other injury. If a fracture is met with, and if it is found to proceed in a straight line,

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this incision should have the same direction: Or if it takes an angular course, the incision should likewise do so, for the sole object of the one is to bring the other as completely as possible into view."

At p. 74: he says, "In proceeding to the operation, if we were to follow the usual practice, we should lay a considerable portion of the skull bare round the part intended to be perforated. But this ought by no means to be imitated; for although it is necessary to remove as much of the pericranium as may admit of the head of the instrument being applied as frequently as it can be needed, yet more than this ought not to be removed: tedious exfoliations of such parts of the bone as are thus denuded, would most probably be the consequence; a circumstance which not only renders the cure extremely tedious

but which adds to the real hazard of the operation.

“ We are, therefore, either with a scalpel or with the raspatory, to separate and remove just as much of the pericranium as will admit of a free application of the trepan.”

At p. 90, he observes, that “ much variety occurs in the directions given both by ancient and modern practitioners, for the dressing of the sores after this operation. With a view to preserve the dura mater and brain from mortification, various antiseptic applications have been recommended, and dossils or syndons covered with these are desired to be introduced, not merely into the perforation formed by the saw, but to be pressed in between the skull and dura mater as far as this can be easily done. The impropriety, however, of
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this practice must at once appear obvious when we reflect upon the effects of it. The sole object of the operation of the trepan is to remove compression from the brain; now the dressings we have mentioned, namely, dossils of lint crammed into the different perforations, must evidently have a considerable influence in counteracting this, not only by the pressure directly produced by the introduction of them, but by their serving to prevent that free discharge of matter after the operation with which the safety of the patient is often very much connected. Instead of this the dressings ought to be of the mildest nature, and should be as loosely applied as possible.—Dry lint is very commonly employed; but it proves much less irritating when thinly spread with any simple liniment of wax and oil; and no detriment ensues, as has been imagined by some, from the application

application of unctuous substances to the brain. No tent or doffel should be inserted into the perforation ; all that is necessary being to apply as lightly as possible over the fore, a pledgit of soft lint spread with an ointment such as we have mentioned ; and this being covered with a compress of soft old linen, the whole should be retained with a common night cap, made so as to tie below the chin, and to be either pinned or tied of a proper tightness, on the fore or back part of the head.—This supports the dressings with sufficient firmness ; and it neither keeps the head too tight, nor prevents a free flow of matter from the fore, an inconvenience very apt to occur from the use of those bandages which are commonly employed after this operation.

“ The patient, on being removed to bed, should have his head placed in
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such a manner as to prevent the fore from being hurt; at the same time his position should be such, as will most effectually contribute to the discharge of any matter that the fore itself may afford, or of blood or serum that may ooze out from the surface of the dura mater."

At p. 106 he says, "the state of the wound should be attended to; for after the operation of the trepan, the membranes of the brain are particularly liable not only to inflammation, but to gangrene. In other parts of the body, we know that nothing so certainly prevents inflammation and gangrene, at the same time that it tends to mitigate their violence when present, as a free suppuration being induced upon the parts affected; and whoever will attempt a similar practice in wounds of the head will find, that although, from the nature

nature of the parts in which the affection is seated, it may not prove equally successful, that it will however prove more so than any other method of treatment hitherto employed.

“ With this view, warm emollient poultices and fomentations should be applied over the dressings; and by taking care to renew them every two or three hours, it will commonly happen, that a plentiful flow of matter will take place from the perforations in the skull, by which any tension which occurred will soon be removed, at the same time that all the other symptoms will be rendered more moderate.

“ The dressings which are first applied after the operation, should consist, as we have said, of the mildest articles, and applications of the same kind should be continued during the cure. At each

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dressing,

dressings, any matter that is formed on the surface of the sore may be easily removed by a piece of soft sponge, or of lint, being introduced in a cautious manner into the perforations in the bone; and this being done, the sore should be covered as quickly as possible, with a pledgit of any mild emollient ointment.

“ When the cure goes properly on after the sloughs which have formed upon the surface of the sores have separated and fallen off, new granulations will appear upon the dura mater as well as upon all the rest of the wound; and these continuing to advance, the different openings made by the trepan will at last be completely filled up, and the whole being brought as nearly as possible to a level with the rest of the teguments, a cicatrix will in general be obtained

obtained by the same means, that are found to prove successful in other parts of the body."

REMARKS.—In collecting the materials from different authors for the above Historical Sketch, I have endeavoured to do justice to the opinion of each, and have made such extracts from their writings, as I hope will enable the reader to judge properly of their method of practice.

I have intentionally said nothing of the manner of perforating the skull, when it, or its contents have received any injury from external violence; as the instruments employed for that purpose, I believe all over Europe are now only the trepan or trephine; the effects of which are intended to be exactly the same, and the application of either I suppose to be well understood.

This sketch may perhaps by some gentlemen be thought very incomplete, respecting the number of authors who have written on the subject. I confess to have extended it no farther than the limits of my own library ; but in the catalogue here produced, I believe will be found most of the masterly writers in all ages ; from whence we may learn, that notwithstanding different methods of denuding the cranium previous to its perforation, have, at different times been practised, such as various forms of incisions, and the excision of more or less of the scalp, with a removal of the pericranium ; yet, after the operation was completed, the intentions of curing the wound, from the days of Hippocrates down to the last ingenious writer, Mr. Bell, have been delivered to us, as precisely the same ; although the means of accomplishing that purpose have been frequently varied.

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The method of curing these wounds then, viz. by encouraging suppuration of the dura mater, &c. we learn, was first taught by the great Hippocrates, and has been the basis of our practice it seems for more than two thousand years ; but I am sorry to observe, that its success has not been found adequate to our expectations ; and in this opinion I am supported by the testimony of some eminent modern writers.---Influenced by these considerations, I have ventured to publish the following case of a fractured skull and observations ; earnestly wishing thereby to excite experienced surgeons to attend to this important subject, and to consider how far the long established method of cure, employed in such cases, appears to be well founded.

NARRATIVE

OF THE

CASE OF A FRACTURED SKULL,

B. Y.

MR. WILLIAM JONES, Surgeon.

J BURTON, four years and three quarters old, on the 12th of Sept. 1783, received a small wound in his head by a brick falling from the top of a chimney twelve yards high, which struck him to the ground. He was immediately taken up senseless, and conveyed to his father's house, which was only a few yards distant. I saw him in about half an hour after the accident, and found him in a comatose state, vomiting frequently, his body and extremities

limbs cold, and his pulse small. The wound bled freely, and was of a triangular figure; the basis of which lay transversely near the occiput, and its perpendicular almost parallel to the sagittal suture. Upon introducing my finger into it, I felt a fracture of the skull with depression. This, with the attendant symptoms, determined me to apply the trephine, and I sent to Mr. Mynors, desiring the favour of his advice and assistance in the operation. When he arrived, which was within an hour and a quarter after the accident, he approved of my determination, and recommended the wound of the scalp to be sufficiently dilated, by making an incision down to the pericranium *only*, at each corner of its base; both together forming a line about 5 inches long, passing somewhat obliquely across the head, nearly over the angular junction of the occipital with the two parietal

parietal bones; and a third incision to be made from the anterior angle of the wound about two inches and a half long, almost parallel to the sagittal future. The portions of scalp marked out by the incisions to be then dissected from the pericranium, and raised sufficiently to expose the whole extent of the fracture, as well as to make room for the application of the trephine. This being done, the fracture was found to be situated in the posterior part of the left parietal bone, nearly in the middle between its superior and inferior angles, and almost close to the lambdoidal future. The fractured piece of bone had somewhat of a semicircular form, was in circumference more than equal to the size of a half crown piece, exclusive of several irregular points, and was in part depressed in depth equal to its thickness. Mr. Mynors advised the application of the trephine to that part
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of the sound bone nearest to the lambdoidal suture, in such a manner, that the edge of the instrument might fall into the fracture; that appearing the most favourable part for the elevation of the depressed portion of bone, as well as most depending; and he held back the inferior flap of scalp, whilst I perforated the bone with a common sized trephine; previous to which the rugine was used, but in such a manner, that no more of the bone was denuded, than the crown of the instrument would cover. On the removal of the circular piece of bone, I tried to elevate the depressed fractured portion, but without success. A second application of the trephine was therefore made, in the same manner as the first, nearly three quarters of an inch from the former perforation, and between it and the sagittal suture: but at the particular request of Mr. Mynors,

I did

I did not use the rugin preparatory to this last application of the trephine.

After these perforations were made, a portion as large as a halfpenny of the depressed fractured bone, (which in the attempt to raise it with the elevator was found to be loose) was removed by means of a pair of forceps; the remaining part of the depressed piece was then elevated, and every small splinter and angular point of bone carefully removed. On the dura mater thus exposed to view, we found a small quantity of extravasated fluid and coagulated blood, which was very cautiously absorbed and wiped off with a small piece of sponge. Mr. Mynors now mentioned to me the use he intended to make of the lip and flaps of scalp, which had been raised from the pericranium and preserved entire; requesting that he might dress up the wound

wound the first time. He accordingly began with moistening the inner surfaces of the lip and flaps of scalp, as well as the pericranium and parts of the dura mater, which were now become dry by exposure to the air, by touching them lightly with a sponge wrung out of warm water. He next desired me to apply my hands flat across the head, at a small distance from each side of the wound, and to bear them a little towards each other, in order to gently press, and support the scalp adherent to the pericranium towards the center, whilst he extended the flaps over the whole of the parts which had been denuded in the operation, bringing their edges every where into accurate contact, and applying narrow and long slips of adhesive plaster at small distances from each other, to retain them in that situation. The other dressings consisted of a tow-pledgit spread with

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a cerate composed of equal parts of wax and oil, a soft linen compress, and the whole retained by a six-tailed bandage.

The boy was then put to bed, a low diet directed, and a mixture with antimonial wine and thebaic tincture ordered to be given at stated times. He continued comatose during the former part of the night.

Sept. 13. He had vomitted once since the operation; in other respects had passed a very good night. His heat was a little more than natural, his pulse rather quick, and his skin moist. He made no complaint, and had had no more sleep than might be attributed to the medicine he had taken.

Sept. 15. The pledgit which adhered to the scalp was removed in part, and a fresh one applied over it.

Sept.

Sept. 17. The former pledgits, as also the slips of plaister, were on this day removed entirely. The scalp was now found to be perfectly united every where the pericranium, *as well as to the dura mater*, except a very small portion of the latter rather larger than a split pea, at the meeting of the angles of the flaps, where one of these angles had retracted for want of boney substance to support it. In the course of the incisions a kind and very small digestion appeared, which diminishing daily, they healed in a fortnight. Granulations from the small portion of the dura mater which was found uncovered after the first dressing, and from the edges of the flaps of scalp immediately surrounding it, by degrees joined together, so that this small portion of that membrane was compleatly covered in three weeks, and the whole wound entirely healed in the space of six weeks after the operation.

It

It would have been cicatrized sooner, had not some scabs formed, which retarded the cure during the last fortnight.

The surface of the small portion of the dura mater found uncovered on the entire removal of the first dressings (Sept. 17th, 5th day from the operation) as described above, was gently cleaned with a small piece of sponge, moistened with warm water, and now, for the first time, dressed merely superficially, with a small pledgit of lint spread thin with the above-mentioned cerate. This membrane and the incisions of the scalp, were, during the remainder of the cure, dressed every day in the same manner, being only just covered with narrow pledgits of lint spread thin with wax and oil; over these pledgits as well as over the newly-united portions of scalp, long and narrow slips of adhesive plaister, &c. were daily applied, and

and were continued for some time after the cure was completed.

On the fifth day from the operation, the heat of the child's body and his pulse appeared to be perfectly natural. He had no complaint after the first night, and, when asked how he did, he always replied that he was very well; so that no medical assistance was necessary, further than occasionally opening his bowels, during the five first days.

N. B. On Feb. 28, 1785, I saw the boy, and had the pleasure of finding him in perfect health. Nature was filling up the loss of boney substance very fast, the cicatrix appearing merely as lines producing no deformity, and the hair growing on the portions of scalp which had been raised from the pericranium, as well as if no operation had taken place.

P.S. The perusal of Mr. Mynors's Treatise on Amputations, &c. had induced me to think more than I had ever before done, of the utility of uniting a great variety of recent wounds by means of the inflammatory adhesion; and though previous to the date of the case, I never had an opportunity of conversing with him, on the application of his doctrine to wounds of the scalp, made for the purpose of the operation of trephining; yet, as he gradually communicated his ideas to me during the process of the operation, I was glad to embrace what I had great reason to think, a very material improvement of the universally established practice in these cases; as it at once appeared evident to me, that nature would be better assisted, in every respect, by the method of cure suggested by my friend, than by the suppurative process, &c.

OBSER-

OBSERVATIONS
ON THE TREATMENT OF
FRACTURED SKULLS;
INTENDED TO INCULCATE THE
PRACTICE OF UNITING THE WOUND,
FORMED AFTER
THE OPERATION OF THE TREPHINE, &c.
BY THE
INFLAMMATORY ADHESION.

IT is now more than two years since I published a little treatise under the title of, "Practical Thoughts on Amputations, &c." wherein, after describing the operative and curative process of that particular mode of amputating, with observations thereon; and faithfully relating the great success which had attended a sufficiently extensive practice in that department of surgery, I strongly recommended that method; believing it capable of being

employed with more advantage to the patient, in every part of the body, requiring such operation, than any other which had ever been in use.

Those few gentlemen who have attentively perused the tract alluded to, must have observed, that, agreeable to the method of practice therein related, I declared from experience, that similar success had likewise constantly attended the cure of wounds, formed by the extirpation of various species of diseased tumours; and that the same easy and expeditious method of cure had likewise been extended to large accidental recent wounds of different kinds*.

* And might not the practice of preserving the integuments, and attempting the union of the divided parts by the first intention, with the greatest propriety, be applied to the radical cure of the hydrocele of the tunica vaginalis testis? employing only a simple incision, the whole length of the vaginal sac, in recent cases; and in others, where by long continuance of the disease, the tunic is become thickened, or greatly

Since the time of publishing that treatise, I am happy to confirm the success of the method of cure therein recommended, not only by my own practice, but by that of many others. I must, therefore, beg leave to refer the reader to that little work, if he wishes farther information on the subject; apprehending he will then readily coincide in opinion with me, and believe that the

distended, removing more or less of it, at the time of the operation, by two semilunar incisions: then accurately closing up the divided parts and attempting their immediate union by the inflammatory adhesion: and does not such mode of treatment seem likely to fulfil the design of the late Mr. Else? who, notwithstanding he was the great advocate for curing the hydrocele by the application of a small caustic, says, in his treatise on that subject; [Vid. Else's works, p. 21 and 22.] "the method of cure by incision is one of the most easy operations in surgery"; and if it "was followed with no worse symptoms than commonly attend castration, it would perhaps be preferable to any other method."

This method of curing the hydrocele, I suggested to several of my professional acquaintance nearly three years ago, but I have not yet had an opportunity of trying the event. ** See Note at the end of the 13th vol. above*

above mentioned case of fractured skull, with the method of treating it, may with justice be considered as a proper appendage to that particular doctrine and practice.

The case described above, independent of its particular treatment, I consider merely as a common fractured skull with depression and a wound of the scalp; such as practitioners frequently meet with: it was accompanied with symptoms sufficiently urgent to justify the operation, and probably might have proved successful, had it been treated agreeably to the rules of the established practice.

But it is well known to gentlemen of experience, that instances have frequently occurred, where the symptoms appearing soon after the accidents have
been

been much less violent than those related above, and yet the events have proved fatal.

It is the method of treating this case then, which merits our attention; and whoever carefully peruses the narrative will observe, that the mode of practice, therein related, differs materially from that which has been so long and so universally established, both in the manner of preparing the cranium previous to the application of the trephine, (scalping as it is commonly called) and also in the subsequent treatment of the wound formed by the operation.

Presuming therefore in these particulars to depart from the established practice, I must here beg leave to remark, that having long lamented the great fatality attending the general treatment in cases of this sort, (too well

known indeed to every practitioner) and having my mind strongly impressed with the idea of uniting divided parts by the first intention after all operations in surgery that could possibly admit of it; I was led to give a minute attention to the anatomy and physiology of the several parts of the head, usually injured in fractured skulls, which seem likely to receive relief from the operation of the trephine, and was thence induced to put in practice the above-mentioned treatment; hoping it would be found capable of obviating many of those dreadful symptoms which have been frequently observed subsequent to the operation, when conducted upon the established plan; and am happy now to declare that the success of the above case has clearly proved the rectitude of my opinion.

And.

And if my zeal to establish this mode of treating similar cases, and for extending the practice of uniting recent wounds by the first intention, and also the wounds formed after all other operations, wherein the least possibility of success may appear, should incur the censure of some practitioners; to them I reply, that from the great facility with which this cure was accomplished; and from a successful experience, (perhaps more extensive than that of the generality of my contemporaries), of this very beneficial practice in the cure of various cases in surgery, I am enabled to recommend it with confidence to others.

By comparing the preceding Historical Sketch with the treatment of the fractured skull just described; the intentions of cure after the operation, will, I believe, to every reader, appear directly opposite; in the former, we learn
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that in such cases, it has been the practice in all ages to encourage suppuration of the dura mater and the rest of the wound ; in the latter, the intention was expressly to accomplish the immediate union of the whole wound by the inflammatory adhesion. To the consideration therefore of practical gentlemen more particularly, do I now recommend the method related in the narrative ; not doubting of its being found highly meriting their utmost attention, and imagining that some of them may possibly unite with me in this opinion, that, as far as the authority of a single case can prove, the success of the above may tend to shake the foundation of the established practice.

For, notwithstanding, in cases of injuries done to the brain and its meninges from external violence, accompanied with fractures of the skull, I entirely agree

agree with a modern judicious writer, who teaches us “to remove all such parts of the broken scull, as may press, wound, or irritate the brain or its membranes; to take away all such extraneous bodies, as can easily; and without violence be got at and extracted; and to make such openings, as may most conveniently serve the purpose of discharging blood, or serum;” yet in accomplishing these points, I can by no means acquiesce in the practice of cutting off any portion of the scalp, or destroying the least part of the pericranium, more than what must inevitably be done by making the necessary perforations, and removing the broken pieces of bone;* for the advantages to be obtained in the curative process, by

* In fractures with comminution, the wound of the scalp may be dilated by a simple incision, or by making as few angular flaps as possible; then by carefully dissecting the scalp from the broken pieces of bone, the loose fragments may be extracted with the forceps, &c. without the use of the perforating saw.

a careful preservation of the soft substances will, I trust, appear evident to every one who considers the anatomy of the parts concerned in the operation of the trephine, and who reflects but a single moment upon the treatment of the boy's case; as by the immediate application of the preserved lip and flaps of the integuments to the dura mater and pericranium, *that cure* was so easily and expeditiously accomplished: and if, on any future trial of similar practice, the immediate union of all the divided parts should not follow; inflammation of them, by such attempt, could not I believe be increased, nor would suppuration be retarded; and after granulations of new flesh were completed, the wound would then be prepared for a speedier and better cure, than by any other method yet devised. Ought we not, therefore, to avoid unnecessary

necessarily destroying even the smallest portion of these parts?

From the historical sketch we learn that much attention has, in all ages, been paid to the treatment of the scalp, previous to the removal of any part of the skull; some authors directing it to be raised up from the bone, by dissecting it in portions of various forms marked out by incisions; others, especially in modern times, have boldly recommended and practised the excision of considerable parts of it: yet notwithstanding such a diversity of opinions respecting the forms of these incisions, has at different times prevailed, I believe they have universally agreed that such incisions should be carried down to the bone; pretty generally pleading the necessity of denuding it, by intentionally destroying the pericranium, on the authority of Celsus; and have continued that practice

tice from his days, down to the time of a contrary one's taking place in the boy's case. But had surgeons seriously reflected on the intimate connection which naturally subsists between the pericranium and dura mater; and had they borne in mind (what is believed to be true) that whenever one of these membranes is destroyed by suppuration, the other becomes affected; they would then have been sufficiently apprized of the great impropriety in destroying any more of the pericranium, than what must inevitably be done, by making the necessary perforations in the skull, and by removing its fractured pieces. Instead therefore of scraping it off the skull with a ruginé, I would recommend it to be divided by the perforating saw only, treating it as I always do the periosteum in amputations of different parts of the extremities; for I believe the structure of both membranes to be similar,
and

and composed of the same nearly insensible substance.

If this preservation of the integuments then, can be allowed in the process of trephining without rendering the operation less effectual; and if by a proper conduct in this respect, the wound may be rendered fitter to accomplish every intention of cure, than, it can possibly be, by any other means hitherto used; does it not become highly necessary to inquire by what method such design may be best fulfilled? I hope therefore I may here be permitted to offer my thoughts on that subject.

In cases of injuries then done to the head, from external violence, without a wound of the scalp, but which require the operation of the trephine, after clearing away the hair by the razor or scissars, I would recommend the following

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ing method: Make a simple incision of the soft parts, with a knife, in the center of the injury, down to the pericranium *only*, in such direction and of such extent as the injured part of the head may seem to require; in a case of fracture of moderate size, the incision may be four or five inches long; each lip of scalp formed by this incision, is then to be carefully dissected close from the pericranium in a semilunar form, as much as may be found necessary for the purposes of ascertaining the width of the fracture, and to make room for the application of the trephine. In a fracture of larger extent, where a simple incision altho' carried somewhat longer than that recommended above is not found sufficient, a farther dilatation may be easily accomplished by only making a transverse section of one of the lips formed by the simple incision; beginning from the central point of that lip which

which covers the greatest part of the fractured piece of bone; carrying it on far enough, and forming thereby, when raised from the pericranium, two angular flaps, more or less acute, as the form and extent of the fracture may require: and so you may proceed to raise one flap more from the other lip, if such very extensive dilatation should ever be found necessary. But for obvious reasons, I think this should always be remembered, that we dilate sufficiently, but yet make as few angular flaps of the scalp as possible, whether there be a wound or no wound previous to our incisions. This rule will also properly direct our conduct in a case of fracture with a wound of the scalp of any sort, made by the accident; and will sufficiently convince us of the great impropriety of the crucial incision, &c.

When the operation has been conducted upon these principles, will it not appear evident, that the compound fracture of the skull (as it may be literally called) has been reduced to as simple a state as possible? Then why should we not attempt to cure it by the first intention, as we would cure a simple wound in any other part of the body? and more especially if what an ingenious modern systematic writer has declared, be true, “that after the operation of the trepan, the membranes of the brain are particularly liable not only to inflammation but to gangrene.”

Hence in the curative process of these wounds, should we not be particularly attentive to the dictates of nature? ought we not to be as diligent in their after-treatment as we have been in the operation itself? and does the
chirurgic

chirurgic art furnish us with any method more likely to soothe her distresses sooner and more effectually, than the immediate application of the lips or flaps of the scalp---*living substances* of the same body, to those portions of the membranes of the brain, or even to the brain itself, which had been necessarily exposed to the influence of the air, &c. in the operation? thereby intending an immediate union of all the divided parts and a total exclusion of extraneous substances from their distracted fibres, which now certainly ought not to receive any farther irritation.

Does not the method of treatment then, which was practised in the boy's case, appear to be more conducive to the great purposes intended by the operation of the trephine than any one hitherto suggested? And will it not often be found capable of preventing

many of those alarming and dangerous symptoms, which, more or less, are frequently observed to attend the long established mode of treating wounds of this sort? such as high degree of inflammation, large suppuration, fungus, or sphacelus of the dura mater; inflammation, suppuration, sphacelus, and dreadful fungus of the pia mater, or even of the brain itself; accompanied with fever, delirium, and frequently with such a train of other violent symptoms, as too often endanger the life of the patient; or when the cure does take place, it is many times with an exfoliation of the bone, and always by a long, tedious, and painful process. We ought I think therefore in our method of cure, studiously to avoid creating any dangerous or aggravating symptoms, in addition to those arising from the injury

injury itself, and its necessary operation.*

The above method of practice, which I earnestly wish to inculcate, may appear to have a number of difficulties to surmount, from its novelty, and from having the support of only a single case; notwithstanding, I am bold enough upon this occasion to advance what a modern ingenious writer has lately said upon another, that “prejudice from and supported by ancient authorities, will here, as in most cases, have some effect in preventing a new proposal from being at first attended to: but we think it probable, that no great length of

* For notwithstanding, in certain cases of fractures, the necessity of perforating the skull appears so very obvious; yet, unless, great attention be paid to the working of the perforating saw, in the latter part of the operation, much injury by it, may be easily done to the dura mater; especially, when that membrane has not been detached from the under surface of the skull by the blow, &c.

of time will be required to place it in a more favourable point of view."

There are some cases it is true, in which the method recommended above cannot be fully employed; for instance, where the perforation has been delayed till matter has formed upon or under the dura mater; where different kinds of foreign bodies are lodged in the very substance of the brain and cannot be extracted; and, where the fractured portion of the skull has been attended with an absolute loss of part of its integuments. In such cases, the tedious and painful process of suppuration, &c. (though assisted by the mildest means) must in part be dispensed with: yet whoever considers these cases as exceptions to the general rule, will, in his treatment of them, by having an eye to such rule, be enabled greatly to expedite the cicatrization of the wound.

But

But if it should be asked, from the remarkably mild symptoms and very expeditious cure which followed the operation in this instance, whether, the same treatment indiscriminately used in all future cases that will properly admit of it, will alone be sufficient to secure the patient's life, I answer in the negative; being too well convinced, that the brain and its meninges from various external causes, have suffered, and may frequently suffer such great violence, as to render vain our best and most improved attempts to save the patient.

Nevertheless, in all similar cases, as well as in others, where the whole of the integuments have been carefully preserved, and all extraneous bodies removed; I cannot be too solicitous in recommending the aforesaid practice, and in desiring the surgeon to consider the very different effects which must be produced

produced in the constitution, by using such *opposite methods of cure*, as the one which has been so long and so universally established, and that related in the Narrative; the former exposing a large surface of the dura mater, &c. to the *suppurative inflammation* and all its consequences; the latter soliciting nature to employ her friendly process the *adhesive inflammation*, and close up the wound with her usual mildness and dispatch.

Fac igitur, & spera.

Note, to be added to page 133:
even cases of Hydrocephalus have since occurred in this neighbourhood, and have been, by different practitioners successfully treated agreeably to P. I. N. I. S. this Plan.
The symptoms succeeding each operation were exceedingly mild, and their cures were very expeditious and complete.

Since the publication of

Cases of fractured skulls
have, by different Gentle-
men, been successfully
treated, according to the method
herein contained, four of
which, in the course of their
cures, fell under my own
inspection.

Thos. Sympson.
Nov. 17. 1791.



Practical Thoughts

O N

AMPUTATIONS, &c.

BY R. MYNORS, SURGEON.

inter sanam vitiatamque partem incidenda scalpello caro
usque ad os est sic, ut neque contra ipsum articulum id
iat, & potius ex sana parte aliquid excidatur, quam ex
egra relinquatur. Ubi ad os ventum est, reducenda ab
o sana caro, & circa os subsecanda est, ut ea quoque
parte aliquid ossis nudetur: dein id ferrula præcidendum
est, quam proxime sanæ carni etiam inhærenti: ac tum
ons ossis, quam ferrula exasperavit, lævanda est, su-
raque inducenda cutis, quæ sub eiusmodi curatione laxa
sse debet, ut quam maxime undique os contegat. Quo
tis inducta non fuerit, id linamentis erit contegendum,
super id spongia ex aceto deliganda. Cætera postea
c facienda, ut in vulneribus, in quibus pus non moveri
bet, præceptum est.”
CELSUS.

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